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THE SCOTCH IRON TRADE—No. XX.

THE CLYDESDALE AND MOSSEND IRONWORKS, AND THE GLASGOW IRON COMPANY.

One of the newest and most complete establishments in Scotland for the manufacture of malleable iron is the Clydesdale Ironworks, belonging to Messrs. Bain and M'Corkindale, the opening of which took place about two years ago, These works are situated in a field on the estate of Milnwood, made famous by Sir Walter Scott in his "Old Mortality." It is in the immediate vicinity of the main line of the Caledonian Railway, from which there are three branch lines entering the works, thus affording the most ample facilities for the large mineral traffic to which the works give origin. The most notable feature about these works is the use, on a larger scale than can be found anywhere else, of the Gorman heat-restoring gas furnace. There are twelve puddling and two heating furnaces, all on this principle, and there are two other furnaces on the ordinary reverberatory principle. Three large sheds, supported on strong iron pillars, and having an ornamental framework running along their entire length and breadth, cover the works. Close to the furnaces there is a 40-cwt. steam-hammer, with a double-acting movement. The plate-mill is furnished with the patent lever of Messrs. Spencer and M'Corkindale, and other contrivances designed to prevent the breakages to which mills of this kind are so liable. A horizontal engine, with a 36-in. cylinder, and a 6-ft. stroke, actuates the rolls. The diameter of the crank shaft is 16 in., and the fly-wheel, with a diameter of 23 ft., weighs about 30 tons. The engine was built by Messrs. Strathern, Murray, and Paterson, of Coatbridge, and is quite a credit to the builders. Steam is generated in four flue boilers, with Galloway tubes, each 7 ft. diameter and 24 ft. long. At the end of the boilers there are three pairs of fanners, for the supply of blast to the furnaces. These fanners are designed from a patent of Mr. Gorman, and possess several features entirely their own. The shaft revolves at the high speed of 2000 revolutions per minute, and so perfect is the action of the fan that no vibration whatever is felt. A diagonal engine, with a 12-in. cylinder and a 16-in. stroke, supplies motive-power to the large shearing machine, which cuts 1½ in. by 6 ft. plates with the utmost ease and exactitude.

Messrs. Bain and M'Corkindale are chiefly engaged in the manufacture of boiler-plates and boiler tube-strips. They also do a good business in ship-plates, having on their books some of the principal iron shipbuilders on the Clyde. For the last twelve months the firm have been quite unable to overtake all their contracts, and considerable extensions have, therefore, been projected, which will raise the production of the works from 400 tons per month to about 1000 tons. The principal extensions will be other ten puddling and six heating furnaces, on the Gorman principle, and several other reverberatory furnaces for occasional or incidental use. A new 24-in. plate-mill is also being put down, on Ramsbottom's reversing patent, with accessory appliances. An artificial pond, some distance off, supplies the works with water, which is brought to the boilers through a large culvert, and pumped into a tank, erected at an elevation of 8 ft. from the ground, by a donkey engine. The Clydesdale Works are favourably situated for carrying on a large and lucrative trade. They are in the very centre of large mineral fields, and they can draw their supplies of pig-iron from the immediate vicinity, the Wishaw, Coltness, and other works being close at hand. They devote special attention to the requirements of shipbuilders and malleable iron tube makers, and as these are two of the largest industries in the West of Scotland, they are likely to find their hands regularly full. The site acquired for the works also afford ample scope for further expansion, when that is found necessary, as no doubt it will soon be, if we may judge of the future prospects of the iron shipbuilding trade by what we know of the past.

The Mossend Works are also in the immediate neighbourhood of Holytown. They adjoin the railway station, to which several sidings give them easy access. These works were established about the year 1840, by the family of which Neilson, the inventor of the hot-blast, was the most distinguished member. Built originally on a small scale, they only comprised eight puddling and two heating furnaces. From time to time the works have had to be extended, until now they occupy the proud position of being, with only one exception, the largest works of the kind in Scotland. Covering altogether about 50 acres of ground, the works comprise three refineries for making plate-iron; 62 puddling furnaces, all built on the usual reverberatory plan; and 17 heating furnaces. Gas from the boilers is used to a considerable extent in the heating furnaces. There are also two scrap-furnaces of the usual kind. The production of the works is little short of 1000 tons of finished iron per week, and includes all qualities and sizes of iron used in foundry and shipbuilders' work. It was at Mossend that angles for ship frames were first rolled the whole length, and it may be interesting to state here that the first order of this kind was executed for a Cunard line steamer, built in the earlier days of that famous company by a well-known Clyde firm. Besides ship and boiler plates we find in the list of staple productions flats up to 12 in., rounds to 7 in., angles from ¾ in. to 9½ in. by 4 in., and bulb iron 6 in. up to 11 in. The latter is largely used in the Clyde for deck beams. The appliances otherwise comprise five steam-hammers, of varying size and power, by Condie, Nasmyth, and Rigby, and two plate-mills, the largest being adapted for rolling plates 72 in. broad by 30 ft. long. The Mossend Ironworks give employment to upwards of 1000 workmen, and the wages paid amount to little short of 5000*l.* per month. The company have no pig-iron works of their own, and are, therefore, dependent upon other works for this requisite. They are, however, the proprietors of several collieries, including those of Shaws and Midhill, near their works, and Orbiston, near Motherwell, from which they draw their supplies of fuel.

In the course of these articles we have already had occasion to refer to the Glasgow Iron Company, which carry on the manufacture of iron in all its branches, from raising the ironstone to the make and sale of finished iron. The pig-iron works of the company at Wishaw we have already described, and we now propose to glance at the leading features of the malleable ironworks of the company. These are three in number. Two of them are situated at St. Rollox, about a mile from the Cross, and are right under the shadow of the famous St. Rollox chimney, which, rising to the height of the Great Pyramid, has been pronounced the tallest chimney in the world. The other works are at Motherwell, near by the station of that name on the Caledonian Railway. It is rather over 20 years since the latter establishment was started. The works, as originally projected, came very little short of their present size, and they are thus built on a more regular and uniform plan than many other works of the same kind in Scotland, that have been put together by shreds and patches. Between 50 and 60 furnaces are used for puddling purposes, and there are 15 heating-furnaces. The Glasgow Iron Company adopted the Siemens furnace at an early period in the history of the invention, and it was the satisfaction which this furnace gave at Motherwell that caused other firms to adopt it. One Nasmyth's steam-hammer, four of Condie's hammers, three plate and sheet mills, five bar and rail mills, and foundries for the repairs of the machinery make up otherwise the contents of the large establishment, which is equal to turning out from 500 to 600 tons of finished iron weekly. At one time these works were considered the largest of their kind in Britain, and at no other establishment is there a greater variety of iron produced. It is interesting to notice that a private telegraph, 15 miles in length, connects the company's Motherwell works with those at St. Rollox, being the first telegraph used by any private company in Scotland. The example led by the Glasgow Iron Company in this matter has been largely followed, for there is no manufactory now carried on in the neighbourhood of Glasgow that has not a wire communicating with its offices in that city.

At the Glasgow Ironworks, which were established by this company in the year 1845, and is the parent of the others, there are no features sufficiently novel to call for special attention. There are nearly 50 puddling-furnaces, four of which are constructed on the Siemens principle. The weekly productton of finished iron is close on 400 tons. None of the mechanical appliances are of recent invention or construction. The St. Rollox Works are close by the Glasgow Iron Works, and are, like the latter, built in what we may be permitted to call the old-fashioned style. The turn-out is from 100 to 200 tons per week of merchant iron. The head manager of the Glasgow Iron Company is Mr. Robert Cassels, one of the vice-presidents of the Iron and Steel Institute, and the chairman of the committee of management to whom that institution owed so much on the occasion of its recent visit to Scotland.

The Glasgow Iron Company are extensive colliery owners. They raise from their own pits all the coal used at their blast-furnaces and at their malleable ironworks. The whole of their collieries are situated in Lanarkshire, within easy access of their works. Their principal pits are, in the western district of Lanarkshire, Calderbank, Ellesmere, and Provanhall, in the vicinity of Ballieston; and in the eastern district, at or near Wishaw, there are the Wishaw Green, Meadow Head, Netherjohnstone, Wishaw Overjohnstone, Raven's Craig, and Shieldmuir. From these pits the company turn out not only sufficient to keep their works going, but also a quantity to throw into the market.

MINERAL RIGHTS IN THE FOREST OF DEAN.

This privilege is vested in persons termed Free Miners—that is, all male persons born in the Hundred of St. Briavels having worked a year and a day in any coal or iron mine (to the exclusion of all others). This was especially provided for by the Dean Forest Mining Act. How such individuals originally came by the title Free Miner is by no means certain, but the book of Dennis, or the original Mine Law Book, states that the customs and franchises "hath been and were granted time out of mind," and afterwards confirmed by E lward III. The earliest document preserved relating to the laws and customs of the Free Miners of Dean Forest is dated 1668, and the latest 1754, but as Doomsday Book refers to a certain quantity of iron which was supplied by the citizens of Gloucester to Edward the Confessor, and further, as Flaxley Abbey obtained its charter in 1154 for erecting a forge for iron smelting, it is quite clear that at that time, if not much earlier, mining must have been carried on in the Forest of Dean.

So much importance was attached to the business of mining that in 1688 it was made law by the Mining Court that all young men not the Free Miners should be apprenticed to a miner and serve five years, but after a lapse of years it was found that the working of the old mine law was altogether inadequate for the proper management of mining affairs in Dean Forest. In 1832 the Crown appointed a commission to settle the claims of persons having mining rights in the Forest, and to make rules and regulations to be observed in the future in working mines. The award of the commissioners was published in 1841, being confirmed by Act of Parliament, which provided that all Free Miners should give proof of the same to the Deputy-Gaveller, who, after approval, entered the names and places of abode of such Free Miners in a book kept for that purpose. It was also provided that all and every such Free Miner should be entitled to have three grants of gales made to them, and that the proper claimant for an iron mine or coal gale at a certain spot should be determined by priority of application, which was made on a printed form for that purpose, and also entered in a book for reference. For a long period persons who as Free Miners obtained grants of gales entered into the business, labouring at the mines themselves, but when by increased depth the difficulties which presented themselves were too formidable, a company of Free Miners would frequently join together in the same undertaking. The irascible tempers, however, of these persons were exerted sometimes to such a pitch as to prevent much profit being derived from such undertaking: the result was that some were ruined, while others flourished, after having succeeded in getting the whole concern into their own hands.

Men of capital, however, were gradually introduced, and then the old system of mining gave way to order and rule, and more profitable concerns being established. There is not now a single iron mine or colliery in the hands of the wealthy but came originally direct from and through the Free Miner, as having the original title from the Crown, and in some cases the rights were bought for a mere trifle. When once a grant is made it becomes freehold in perpetuity, or until the mine is exhausted, subject, however, to an alteration in the rents and royalties every 21 years. The Free Miner can, therefore, transfer, sell, or mortgage his mineral property, and it may, like any other freehold, be transfered continuously without rendering the preceding holder liable to the payment of any rents or royalties after any such transfer has been registered at the Gaveller's office. A great number of iron and coal gales have been bought up at different periods and held by persons of means until they may elect to develope them, or sell at an enormous profit. Every proposed gale is first approved of by the Crown, and then advertised for a space of three weeks, to give others an opportunity of opposing such a grant, for it frequently happens that there are several applicants for the tract proposed when granted; but althogh this is the case, it is only the first registered applicant who is eligible. Misinformed persons frequently attempt to oppose the granting of a gale to another person; this is natural enough when opposition comes from one Free Miner against another, because either of them may not clearly understand the position of things; indeed, it is a rare occurrence for a Free Miner to investigate the Crown documents and determine for himself who is really the most eligible claimant. This is, consequently, a work for a qualified agent to perform who has engaged to represent the Free Miner. There is, however, another class of persons who sometimes oppose the grants of gales being made to certain Free Miners, and these are the holders of existing gales contiguous to the rise or land side of the proposed grants.

To give an instance of the nature of such oppositions, we may refer to a case which was recently heard and decided by the Deputy-Gaveller. It appears that Cornelius Bennett, Joseph Jones, and others were interested in places to the dip of existing gales, called the Drybrook and Penswells Iron Mines; and it also seems that the deep boundary of the former is determined by points which shall be on a level with another point 100 yards below Limekiln Pool Iron Mine level's mouth, situate at Lydbrook; and the latter, on the deep side, by levels to be driven from the gale mark, situate near Inkerman's Colliery. The Drybrook Iron Mine was granted in 1846, and the Penswells in 1847; they have, consequently, been held for a period of 26 years, without any attempt having been made until very recently to develope them. From a misconception of the Messrs. Brain of the levels and proper thickness of the measures, they believed that the Drybrook Iron Mine and Penswells Iron Mine, which belongs to them, would occupy the greater portion, if not the whole, of the proposed grants; and, three days before the day of grant, which was on Aug. 2, 1872, sent in their notice to all parties concerned The nature of the opposition was not, however, clear from the notice. These Free Miners in question have for some years past been represented by Mr. H. D. Hoskold, of Cinderford, in procuring and selling gales on their behalf; but, as he was too ill to enter into the engineering question, some days prior to the hearing he called in his friend, Mr. Huxham, an eminent engineer, and secretary to the South Wales Institute of Engineers. This gentleman was instructed in the matter, and proceeded to take the necessary levels and work out the question, which he did in the most satisfactory manner to those who employed him; the result of his evidence was sufficient to satisfy the Deputy-Gaveller that there was no just grounds for the opposition created by the Messrs. Brain, and ultimately granted the gale. Mr. Hoskold was on that occasion represented by Messrs. Wintle and Maule, solicitors, of Newnham; and Cornelius Bennett by Mr. Whatley, solicitor, of Mitcheldean, who in a very able way conducted the legal points of the case. Mr. Hullett, solicitor, of Coleford, represented the Messrs. Brain. As they only gave notice of their intention to oppose three days before the hearing, the engineers had not sufficient time to go into the question raised as to the Penswells deep boundary line: the Gaveller, therefore, postponed Joseph Jones's grant until Nov. 8, to enable the parties to bring forward further evidence.

Messrs. Hoskold, Huxham, and Hewlett were, therefore, engaged in taking surface levels, depths of pits, &c., for several days, from which they made a series of seven sections and two plans, to be produced as evidence before the Deputy-Gaveller. The case was got up, too, in due legal form by Messrs. Wintle and Maule, who, with Mr. Whatley and all the witnesses, were prepared to argue on behalf of the galee. The Messrs. Brain, however, brought Mr. Langham (formerly of the Gaveller's office) to give evidence as their engineer, which, together with the severe cross-examination made by Messrs. Wintle and Maule and Mr. Whatley, occupied so much time that the defendants did not commence their case the same day. The Deputy-Gaveller, therefore, again postponed the hearing till the 22d inst. Mr. Hullett seemed disposed to withdraw the opposition, seeing that as the gale mark was outside the deep boundary line of the Penswells iron mine, presuming it took the course they devised it should, and after a desultory and stormy general discussion, in which Mr. Thomas Brain lost his temper, it was proposed by them that the Deputy-Gaveller should alter the wording of the grant so as to meet their views, which was that the Drybrook Iron Mine should not be mentioned as being on the land of the proposed grant. Mr. Brown, the Deputy-Gaveller, would not, however, consent, but determined to make the grant to Joseph Jones. It was clearly to be seen that the Deputy-Gaveller was not called upon to alter the boundary of an existing grant, but to make a new grant, and had he done otherwise the result would have proved most ruinous to a great many holders of gales in Dean Forest.

We will endeavour to explain this. The Penswells Iron Mine was originally granted with fixed limits, being bounded on the south, north, and east by other properties, and on the deep or west side by levels to be driven from a pit to be sunk on the gale mark. It seems that the late Cornelius Brain and Thomas Brain entered into an agreement with one Henry Roberts, who was considered by them to be the most eligible claimant for a grant of a gale at Penswells, the consideration being 1*l.* on signing the agreement, and a further sum of 20*l.* on transfer, when a grant was made; but when the grant was made, in 1847, Henry Roberts refused to transfer the gale to the said parties, and soon after becoming deceased, the said Cornelius and Thomas Brain commenced a suit in Chancery for the fulfilment of the agreement. From the amended bill of complaint brought before the Lord Chancellor, it is asserted over and over that they desired Mr. Atkinson to extend the gale so as to *abut* against Deans Meend Iron Mine; and it appears from the same document that on March 11, 1847, the then Deputy Gaveller agreed to extend the area of the said Henry Roberts, at the instance of the said Cornelius Brain and Thomas Brain, bringing it into contact with Deans Meend Iron Mine, and adding a large tract of iron ore at the south or opposite end. It is indisputably clear that the late Messrs. Brain and Mr. Atkinson originally contemplated, and afterwards actually determined, the extent of the gale. There has never, within our knowledge, been a grant of a gale without giving to it defined limits. It is clear from the bill of complaint that the elder Brain expressed great solicitude for the Penswells to terminate, abut, or be brought into contact with Deans Meend Iron Mine; and so long as it was felt by them to be possible to have a grant made at all, they were perfectly satisfied to have such an area as was usually granted made to them, and such as would have been enclosed by the deep boundary line of workings extending to a point at Drybrook. It must be borne in mind that the wording of the grant is not as usual "as deep as levels will drain," but by "levels to be driven from a pit sunk on the gale mark."

Mr. Atkinson must have known the peculiar geological formation of the "trough," and left out the usual words in the grant. The plan and affidavit made and sworn to by the late Mr. Atkinson and Mr. Langham as being a correct representation of Penswells confirms this view, which plan and affidavit were put in by them at the hearing on the 8th inst. This view must doubtless have been still further strengthened if they had brought forward another affidavit sworn to by Mr. Atkinson, which was supposed to be in their possession, referring to a portion of Penswells marked C on the plan they produced. The area represented by C on the plan, and possibly referred to in the corresponding affidavit they produced, must have made up an aggregate area which was originally granted and bounded within the limits assigned to it on the Crown plan. It is, therefore, easily to be seen that there were strong reasons for keeping back the affidavit marked C.

The principal point raised by the Messrs. Brain was that the deep boundary line would deviate from its position as shown on the Graveller's Plan illustrating the grant, so far as to take a course westward running along the entire length of the Drybrook Iron Mine, cutting away all those gales made since 1847. Mr. Langham, however, although he did not appear to have gone into it, seemed to incline to the belief that the Lydbrook Iron Mine would prevent the Penswells deep boundary line from being carried further. It is believed that he actually asserted this. The Act provides that no new grant shall be made likely to interfere or damage any existing gale, and as the Lydbrook Iron Mine was granted before the Penswells, it would have taken precedence and prevented the Penswells from going past it, presuming the levels of the two had been the same, but the engineers on the other side had proved just the contrary, showing that Mr. Langham was out of Court upon it.

The defendant's solicitors opened their case on the 22nd inst., before the Deputy-Gaveller, on which occasion Joseph Joues proved the position of his gale mark, and was supported by a witness by name of William Simmon's, both of whom were subject to a severe but unnecessary cross-examination from Mr. Hullett, who seeing that he had no case, intimated that they would have no wish to continue further opposition to the grant, providing Mr. Brown, the Deputy-Gaveller, would insert other words in the "form of grant," and erase others which referred to the limits of the land boundary line of the proposed grant, or, in other words, cut out all reference to the Drybrook Iron Mine in the grant, which in effect would have been to have acceded to their (the Messrs. Brain) wishes, but the Gaveller did not consider that the question of settling the position of boundary lines was before him, but that of making a new grant, and therefore, under the circumstance, determined to make the grant, which was done. The Act of Parliament provides that the Gaveller shall, before making a grant, take into consideration all the circumstance of the case with regard to the depth, cost of sinking, and so forth, and give to each grant a sufficient area to justify the expenditure likely to be incurred in opening the mine, then it is certain that the extent and area of each gale is known before it is made, and this has been the practice of the Deputy-Gravellers past and present. Then, if this be so, the comparison of the areas of Penswells, Fairplay, to the rise, and Westbury Brook Iron Mine still further to the rise, would be good evidence as to whether the late Mr. Atkinson, the then Deputy-Graveller, granted a larger area to each grant as the depth increased.

The area of Westbury Brook Iron Mine, the first in order immediately below the outcrop, is about 183 acres; Fairplay Iron Mine, immediately to the dip of Westbury Brook, about 241 acres; and Penswells, immediately to the dip of Fairplay Iron Mine, is about 455 acres. Fairplay is, therefore, nearly double of Westbury Brook, and Penswells nearly double that of Fairplay. It is, therefore, very evident that the late Mr. Atkinson, in his grant of Penswells, gave to it a well-defined, sufficient, and settled area, which was well understood by all parties interested.

If the areas of all the grants that have been made were to be computed it would be found that not a single grant has ever had a greater area assigned to it than about 400 to 520 acres. From the evidence adduced by the Deputy-Gaveller before the Dean Forest Mining Commissioners of 1871, we infer that the extreme area of any grant would be about 700 to 800 acres, probably in the deepest position of the Forest of Dean. Now, it is easy to see the effect which would follow, presuming

the present Deputy-Gaveller had at the hearing on the 22d, or in future were to concede to the Messrs. Brain one inch more than was originally intended under the grant of Penswells. If he had done so their property would consist of a grant without any defined limits in one direction, and would complete an entire circuit round the Forest, sweeping away from others and attaching to itself every gale made since the Penswells, having similar levels. Thus the Victory, Eastbach, Symonds Rock, a portion of the Atlas, the Coleford, Tufton, a portion of Maxwell, Brooklyn, and Whitecroft, also a portion of the Somerset, Berkley Castle, Emperor Napoleon, Duke of Gloucester, Polar Star, and the whole of the Cinderford Iron Mines (unless some unknown contortions of the strata were encountered to cause a change in level) would be taken, adding to Penswells proper an area of, in round numbers amounting to 3500 acres, which, together with Penswells, would make an aggregate area of about 3955 acres.

The opponents to the proposed grants conceived their assumptions, and arguments based thereon, in such a way as to suit their own interests, to the exclusion of legitimate claimants; and it appears to us that their intentions go further, for we believe that their opposition consisted in an attempt to over-rule the powers and office of the Deputy-Gaveller, and also to construe the grant of Penswells in such a way as was never contemplated by the Crown.

The late Mr. Atkinson originally stated that the area of Penswells was 460 acres, and the defendants' solicitors possessed documents (which were not necessary to be produced at the hearing on the 22nd) wherein is contained an affidavit of the late Thomas Brain, in which he took oath that the extent of Penswells Iron Mine amounted to about 480 acres only.

If, therefore, the present Messrs. Brain upon a future occasion deem it desirable to commence a Chancery suit, sufficient evidence may be forthcoming to deprive them of a verdict.

MINING ON THE NORTH SHORE OF LAKE SUPERIOR.

SIR,—The chief mining district at present known on the northern shore of Lake Superior extends from Pigeon River, the boundary line between the United States and Canada, northward to Thunder Bay, and round to Black Bay, stretching back from the coast some 8 or 10 miles. Officially this district forms part of the province of Ontario, although I believe some efforts have been made by the Government of "Manitobah" to claim it as within their province. The chief settlement of the whole region is the town of Prince Arthur's Landing, though the official port for Thunder Bay is still the Hudson Bay Company's port at Fort William, near the mouth of the Kamanistiguia river. The rapid growth of Prince Arthur's Landing, which, from a mere station of a few log huts, has in the last three years spread out to a little town of some 200 houses, is due, first to the wonderful discoveries of silver in its vicinity, and secondly to its being the terminus of the new Government emigrant route to Fort Garrey. Added to this it is the port where all the steamers plying on the north shore call in, and hence it is likely in a few years to become a place of no little importance. The chief mineral district, as at present explored, lies, as I have before mentioned, immediately around the landing, most of the principal mines being in one or other of the three townships of McIntyre, MacGregor, or McTavish. The whole country is, however, full of explorers, &c., fresh discoveries are almost daily reported, so that it is probable within a short period that the whole country between the Dog Lake and the Head of Nipigon Bay will have to be counted in the mineral district.

The geological formation of the country belongs to the Laurentian, Huronian, and Upper Copper Bearing series, the mineral-bearing veins being almost exclusively in the last-named category. The exact age of these upper copper-bearing rocks has not been fully determined, they having been classed by some as belonging to the Permian epoch, whereas Sir William Logan classes them with the Lower Silurian. A total absence of fossils renders the determination of this point very difficult, though from the general appearance of the rocks, and from the character of the veins traversing them, I am inclined to lean to Sir W. Logan's classification.

The rocks belonging to this series consist chiefly of siliceous shales, grey and red sandstones, marls, conglomerates, and trap. The Huronian rocks are principally diorites and talcoid and micaceous schists, while those belonging to the Laurentian series are syenites and gneiss. The most curious feature of the whole country is the great overflow of columnar trap, which seems to be the latest formation of the whole series, and which caps all the highest mountains of the region. The stratified rocks through this district lay at an exceedingly low angle, being in many places quite horizontal, and are traversed by innumerable trap dykes of all sizes, running all, more or less, in a north-easterly direction. There are two distinct classes of veins, the one running parallel to these trap dykes, and consequently at an angle to the stratification of the country rock, while the others run with the strata of the enclosing formation. The gangue of these veins is generally comprised of quartz, calc-spar, fluor-spar, and barytes. The quartz is either compact, granular, or crystalline, both white and amethystine, and from what I could see seems to predominate in the veins running parallel to the trap dykes, whereas the gangue of those veins running parallel to the stratification is mostly of a calcareous nature.

The minerals of this district, so far as known, are: Magnetic iron ore, and sulphurets of iron, galena, zinc-blendes, copper in the shape of grey and yellow sulphurets, silver both native and as sulphide, and gold. More rarely are found nickel, cobalt, arsenic, molybednum, and native bismuth; amethysts and agates are also abundant. The chief veins are mostly of great continuity, nearly all of them having been traced on the surface for miles, although they are not all productive on their whole length.

The principal mines at present opened, or actually at work, are: Silver Islet Mine, the Shuniah Mines, the Trowbridge, the Singleton, the Thunder Bay Mines, the Algoma, the "Z A" Mine, the Silver Harbour Mine, the Leadhills, and Jarvis Island. The accompanying map will show the general position of these mines.

Silver Islet Mine.—This mine, which has already achieved for itself a world-wide reputation, lies to the south of the Thunder Cape peninsula, on a small islet, or rather reef, only measuring about 90 ft. square, and scarcely above high-water level. It was first discovered in 1868, by Mr. T. McFarlane, formally of the Government Geological Survey, but at that time in the service of the Montreal Mining Company, to whom the adjoining location belonged. This company, after extracting about $25,000 worth of ore from the island, became doubtless afraid of encountering the tremendous risks and difficulties to which a continuation of mining on the island and below the level of the lake would expose them, and so sold the whole of the property known as the Woods Location to an American company for the sum of $225,000 on Sept. 1, 1870. Capt. Frue, the able manager for this new company, at once chartered a steamer from one of the American ports, and started for the island, taking men, stores, and provisions, and, above all, timber for the erection of coffer-dam round the island. A temporary breakwater was first erected, so as to enable a commencement of mining operations as soon as possible, and such was the dispatch used that Capt. Frue had mined over $70,000 worth of ore before the close of navigation, in November. From the very start until the end of May, 1871, the company were constantly engaged battling against the waves of the lake, and endeavouring to protect the mining on the island. In November, 1870, a large portion of their work was carried away by a heavy gale, but was soon again repaired. Still, through the winter mining was several times interrupted, owing to the difficulty of getting the "crib" work strong, and, above all, heavy enough to withstand the tremendous seas which at times prevail on this coast. The greatest disaster happened in the spring of 1871, when during a gale nearly the whole coffer-dam was literally pounded away by the floating ice, and the mine was filled with ice and water. Nothing daunted, however, the work was re-commenced, stronger than before, and now stands as a monument of engineering skill and perseverance. The cribbing is in parts over 75 feet wide, and is loaded down with the enormous weight of 50,000 tons of rock, all of which had to be brought from the main land. On the coffer-dam are now erected a large boarding-house for the miners, who number about 145 men, engine-house, containing the pumping and hoisting engine, a blacksmiths' shop, shaft-house, and ore-house. The cost of all this work has been about $200,000. In addition, great improvements have been made on the main land. A whole village has been built, and docks and wharves for steamers have been constructed, and now mining has also commenced there. The vein on the island was about 18 ft. wide at the surface, splitting towards the south end of the island into two branches. The ore-bearing portion of the vein varied from 8 in. to 3 ft. At the present depth of 160 ft. this ore-bearing portion of the vein is about 4 ft. wide, clinging all the way down to the hanging-wall of the vein. The course of the vein is north 34° west, dipping to the eastward at an angle of only 8° to 10°. The ore is a mixture of native silver and silver galena, in a gangue of calcareous par and quartz. It contains also some galena, zinc-blende, graphite, iron pyrites, cobalt, and nickel. A new mineral was found here by Mr. Thos. McFarlane, composed of a chemical combination of silver with nickel and arsenic. The average yield of the mine at the present time is five barrels, or about two tons, of first-class ore per day, which produces in the furnace an average of $1800 of silver to the ton of ore. This of course includes only the first-class ores; all those of a lower grade have hitherto been neglected by the company, but now they are in course of erecting a large mill near the mine for crushing and amalgamating these second-class ores by the Dodge process. The total value of the ore extracted from this mine in the year and a half of its existence is not far short of $1,250,000. The original shares of the company of $50 are now worth $2400 each, and cannot be had at that. The last dividend declared was at the rate of 108 per cent.

The almost unprecedented success of this undertaking of course created great excitement about the mines on the adjoining mainland, and numerous companies have been formed during the last year with a view of working the different veins which have been discovered. The results so far obtained are favourable, though the time has been too short for much development at present, and, unhappily, several companies were started, not for *bona fide* mining, but as mere stock speculations, the management of the mines being entrusted to persons wholly incompetent. The work done, therefore, in many cases has been very desultory and unsatisfactory. That there are mines now at work which will prove immensely rich there can be no doubt, and all that is wanted to develope them is good practical talent, and honest and economical supervision.

The Shuniah Mine.—This mine, which is now owned by a Boston company, is situated in the eastern part of the township of McIntyre, about three miles from Prince Arthur's Landing, with which place it is connected by a good wagon road, thus affording every facility for shipment of ores, &c. The first discovery of the vein was made in 1866 by Peter McKellar, one of the pioneer explorers of this region, and it was at that time opened up and worked, but from lack of funds was abandoned till the fall of 1871, when the great success of Silver Islet Mine drew attention to this region, and it was again opened under the management of Captain T. H. Low. This mine is situated on the chief vein of the district, known as the "Champion vein," having a course nearly due east and west. The formation of the country here is siliceous slate, having almost the same trends as the vein. The width of the lode is from 16 to 17 ft., and nearly perpendicular. It is capped by some 6 to 8 ft. of crystalline quartz, below which the gangue is almost entirely of calc-spar and fluor-spar, containing pockets or druses of amethystine quartz. The vein contains throughout angular portions of the surrounding rocks, as indeed do nearly all the veins of this region; and, according to Prof. Chapman, of the Toronto University, these pieces of rock are very frequently coated with leaf-silver (a sulphide containing 8 to 10 per cent. of silver). Sometimes these breccia assume formidable dimensions, and almost entirely fill up the vein, as at the Silver Harbour Mine. The silver is found disseminated irregularly through the whole vein, though it seems to predominate towards the south wall; it is either in the shape of native silver or more generally as a sulphide. Samples from this mine, assayed by Prof. Chapman, have yielded $2600 per ton, even fragments of the wall rocks are reported by him to have contained over $800 of silver to the ton. There are now three shafts sunk on the vein, about 70 ft. deep and about 300 ft. apart, so that a total length of 600 ft. has been tested on the vein, and silver in more or less quantities has been found throughout the whole course. At the time of my visit to the mine, in September last, the mineral seemed to be concentrating into regular "pilons" near the south wall, and very rich ore was being taken out. The International Mill, belonging to the same company, is situated about 1500 ft. west of the Shuniah, and is now turning out very rich.

The Trowbridge Mine.—This location is situated about one mile to the north-east of the Shuniah Mine, and is now connected with the latter by a good wagon-road. Very little actual mining has yet been done on this location, though the veins, of which there are several, have been explored, and most of them opened upon. The principal vein has a course of N. 20° to 22° E., dipping slightly to the north. The gangue is amethystine quartz, carrying all through it large quantities of silver-lead and zinc-blende. The width of the vein, where it has been opened, is about 3 ft., and good ore throughout; the hanging-wall is composed of silecious shales, while the footwall is formed by one of the above-mentioned bands of crystalline trap. Besides this vein there are on the property several others, one of them running due north and south, and another due east and west. These three veins all cross one another near the eastern boundary of the location, and not far from the rapids of the Current river, and it is very probable that rich deposits of silver may be found as soon as work is begun at this spot. The Champion vein also passes through the southern portion of this location, but has not yet been fully developed. No other property scarcely offers such facilities for mining as this does. The mine can be drained to a depth of over 100 ft. without the aid of machinery, and the Current river will furnish all the power required for mining and dressing the ores.

Singleton Mine.—This mine was only recently discovered. It is situated actually in the town itself of Prince Arthur's landing, on what are known as the Park lots. This mine bids fair to become one of the richest and most profitable on the whole coast. The chief vein crops out at the surface over a distance of 200 ft. Its course is north-east and south-west, dipping somewhat to the north. At the surface it is over 7 ft. wide, and carrying ore throughout. The gangue is amethystine quartz and calc-spar, interspersed throughout with galena, native silver, and sulphides of silver, and more rarely chloride of silver, this being the only spot in the district where I have found the latter mineral. Besides this main vein, there are two cross veins, running nearly due north and south, which, though not as wide as the main vein, are very much richer in native silver. Considerable quantities of ore have been already taken out, and preparations are being made to begin systematic mining at this point next spring. This mine is most specially favoured as to position. There need be no expense for building roads, as the streets of the town will run through the location, and there will likewise be no necessity for erecting boarding-houses for the men and their families, as they can all live in the town. Another favourable feature of this mine, and one which will prove of considerable benefit, is the fact that there is likely to be enough galena mixed with the silver to render the ore fit for smelting, without the costly necessity of adding lead, as is the case with the Silver Islet ores, and others of this region.

Thunder Bay Mine.—This mine is situated in the south-western part of the township of Macgregor, about one mile from the lake at the mouth of Current river. It is at present lying idle, owing chiefly, I believe, to litigation among the stockholders. It is a striking example of the extravagance and mismagement I spoke of above. Large and very costly mills were erected before the capacity of the mine was fully tested, and from common report it would seem that most of the capital was squandered away on surface improvements without sufficient opening up of the mine. The lode on which the mine is situated is probably a branch of the Champion vein. It consists here of a series of small veins, having a course almost due north-east, and dipping to the north-west. The gangue is mostly quartz, mixed with slate, the silver occurring in filaments, or grains, in a native state, though some sulphides have also been found. The shafts, of which there are two, were about 80 ft. deep when the mine was stopped, the vein at that depth being, from all accounts, much disturbed, and not nearly as rich as it was some 30 ft. above. Some of the ores from this mine have yielded over 10 per cent. of silver.

Silver Harbour Mine.—This mine is situated on the coast, near the head of Thunder Bay. It is owned and worked by a Buffalo company, who also owned the celebrated "Z A" Mine, adjoining. These two mines, and more especially the "Z A," promise to become of immense value. The Silver Harbour Mine is opened on a large quartz vein, running north-east and south-west, and dipping to the north; at surface it was about 4 ft. wide, but became divided and split up at a depth of about 40 ft. by intrusions of the country rock, to such an extent as almost to cut off the whole vein. At the present depth, however (60 ft.), it is again concentrating, and becoming much richer. The ores are almost exclusively leaf-silver, with some little native, mixed with zinc-blende and galena. This company have been to great expense erecting dwellings for the workmen, and also constructing a handsome pier and jetty out into the lake, for the shipment of their ores. In this case, too, the total incapacity of the former manager is the chief reason why the mine has not yet been making returns. At present, under the management of Capt. Slawson, there is no doubt but it will become profitable by next season.

The "Z A" Mine is opened on a large vein, having a course of N 2° E, and dipping to the N.W. The vein stuff is calc-spar and some little quartz, the ores being native silver, grey sulphurets of silver, and a combination of nickel and silver. The whole vein is thoroughly impregnated with ore, the latter forming in some parts over 50 per cent. of the whole mass. This vein at present promises to outrival the Silver Islet, and the new discoveries continually being made are almost fabulous. A company has recently been formed, with a capital of $2,500,000, to open and develope this property, and by next spring expect to begin shipments of the ores.

The Leadhills Mine, on concession C, in the township of McFavish, is more generally known as the "C" Mine. It is about four miles distant from the western shore of Black Bay. This property is owned by the Silver Islet Company, who are at present engaged in building a railroad from the mine to the lake for the shipment of their ores. The mine is opened on a very rich vein of galena and copper pyrites, carrying also gold and silver in considerable proportions. It occurs in a pale-red indurated marl of the Silurian epoch; the gangue is quartz, compact and granular, the vein being 10 feet wide, with ore running through the whole of it, though 4 feet of it is a lode of solid ore. The course is N 70° E, dipping to the south with an angle of 10°.

Several other discoveries of similar ore have very recently been made in same district, and by next season, doubtless, several mines will be opened up.

The Garvis Island Mine is situated to south-west of Thunder Bay. It is owned by an English company, and promises to become a very profitable mine. There occurs on the island a very strong vein of quartz and barytes, carrying native silver and sulphurets. Work has scarcely been began here yet, but by next spring everything will be ready for a vigorous start.

Besides all these mines, there are many others which it would take too long to enumerate, and which are at present scarcely enough developed to be able to form any opinion on their respective values.

Before closing I would draw attention to one or two of the many advantages this district possesses over any other silver mining region on this continent. In the first place, nearly every mine here has timber enough at least for present purposes, for although most of the woods have been burnt over more than once, very little of the large timber has been injured so as to prevent its use for mining purposes. In the second place, the facilities for the shipment of ores are unparalleled. Large vessels of four or five hundred tons burden can load at piers belonging to the mines, and bring the ores right through to Liverpool or Swansea without breaking bulk. The present expense of shipping ores to New York from there is only $12 per ton, whereas all the Nevada and Utah ores cost over $35 per ton freight to the same place; and thirdly, the new mining laws, known as the "General Mining Act of 1869," passed by the Legislature of the province of Ontario, are most favourable to mining operations, and were passed more especially to benefit and encourage mining in this district. I have no doubt that, taking all these causes into consideration, added to the actual intrinsic value of the mines, Lake Superior will very shortly become as celebrated for the enormous silver deposits on its northern as it is already for the riches of its copper and iron mines on the southern shore.

New York, Nov. 6. —— E. G. SPILSBURY.

SYNOPSIS OF THE GEOLOGY OF THE MINERAL FIELDS OF THE IRON MOUNTAIN REGION, MISSOURI, U.S.; AND STATEMENT OF THEIR PAST AND PRESENT MINING DEVELOPMENT.

SIR,—The iron mountains of Missouri are situated 90 miles south of St. Louis, and are very nearly in the geographical centre of the valley of the Mississippi, or basin of the continent of North America. The Iron Mountain proper, from which 1000 tons of ore is now shipped daily, is a low conic hill, rising in a circular valley, and surrounded by some five conic and oblong mountains that from two to five miles distant stand as sentinels around this iron centre. These mountains are formed of a dove-coloured and reddish porphyritic granite, and have an altitude of some 200 ft. above the Iron Mountain; the ore is the blue specular, and is exposed 500 yards wide. The surface appearance of this mountain is much the same as one of the conic granite ridges of the New England States. The timber is a scrubby white and black oak, and masses of ore exposed are from 6 inches to 6 feet in diameter, and moss covered, looking like a dark syenitic granite, yet when chipped off shows the blue steel-grained iron ore.

There are two 20-ton charcoal furnaces, built at the end of a ridge, or spur, that runs out from the mountain some 600 ft. The ore to supply these furnaces for the last 20 years has been mined from open-cuts made in the end of this ridge. Since the shipping of ore has commenced by the Iron Mountain Railroad to St. Louis, Indiana, Ohio, and Pittsburgh; cuts have been made along the sides, and track carried up to near the summit of the mountain. A part of the ore is broken, and makes from the grass roots down, and again occurs in massive form, and is taken down by drilling and sand blasts. Some years ago boring was done for water near the furnaces to a depth of 180 ft., the last 40 ft. going through solid iron ore; no water was found, and work stopped at that depth: it would appear from this that the ore from this conic hill spreads out under the adjacent grounds.

This company own 40,000 acres, three-fourths of the stock of the company being owned by Messrs. Harrison, Choteau, and Vallee, of St. Louis. The present net income from smelting and shipping ore is some $2000 per day. Six miles south is the iron mountain known as Pilot Knob, this rises in a sharp conic form 500 ft. above the valleys, and shows masses of specular ore of many thousand tons in weight piled loosely at its apex. Here are two 20-ton charcoal furnaces; the ore is run down an inclined plane from near the top of the Knob. This ore is more siliceous than the other, and in places fades into a reddish porphyritic granite, and is somewhat refractory in the furnace. One mile distant is an oblong reddish porphyry mountain that contains magnificent iron veins, and is called Shepherd's Mountain. The altitude of Shepherd's Mountain, and the Knob is 1000 ft. above the Mississippi river at St. Louis, of the iron mountain first-named 800 ft., and about 1200 ft. above tide water. This iron company also own 40,000 acres around the knob, make pig-iron, and ship ore. Rocks of Cambrian and Silurian age are slightly upturned, and abut against these iron mountains on the west side, and form a valley from one to two miles wide. On the east side the country is a dove-coloured and reddish jaspery granite.

These iron mountains mark the centre of the eastern terminus of the water-shed known as the Ozark Mountain, which has a general altitude of 1000 ft. above the Missisippi river, and runs south-west through Missouri and Arkansas.

The view from the summit of Pilot Knob, the highest point in a circle with a radius of 200 miles, is probably not excelled at any point in the interior of the continent. You stand on great masses of iron ores elevated 500 ft. above the villages of Arcadia, Ironton, and Pilot Knob, and the noted valley of Arcadia lies at your feet. Twenty conic, dome-shaped, and oblong granitoid mountains rise in the distance. From this centre the Merimac, St. Francois, Big Black, and other streams radiate, and empty in the Missisippi 600 miles apart. To the north are 2,000,000 acres of lead fields. To the east 1,000,000 acres of lead, copper, nickel, cobalt, silver-lead, and tin fields. To the south 1,000,000 acres of iron, silver-lead, nickel, bismuth, and gold-bearing quartz districts. To the west, great iron, lead, copper, quartz, and other mineral fields. The Iron Mountain Railroad crosses these fields 90 miles, the Belmont branch 60 miles, the Arkansas branch 50 miles, the Potosi branch 3 miles, and the Atlantic and Pacific Railroad 50 miles.

There are eight charcoal-iron furnaces in Mo, whose average daily production is 120 tons. There are also five stone-coal furnaces and two small zinc furnaces. These consume 6 tons of carbonate of zinc per day. Zinc ores were first smelted three years ago. Twelve lead

furnaces, 1000 lead miners—annual production of lead in the State, $1,000,000. No copper ore has been mined for the last 15 years. The largest lead mine is that owned by the St. Joseph Mining Company, of New York, who own 600 acres. The mine is 70 miles south of St. Louis, and is a stratified vein disseminated through magnesian limestone, cropped out to the grass roots, and worked under a shelving cap-rock; it was discovered fifty years ago, when the cropping vein was from 6 in. to 1 ft. thick, and was followed five years ago until the cap was 20 ft. thick; the vein then pinched out, and the company used the diamond drill, and at 90 ft. deep bored through a disseminated vein 6 ft. thick; this is about one-third ore—sulphuret, 75 per cent. The yield the last two years has been $500 worth of ore per day, and paid $250 net.

The Mine La Motti Company may be named next; they own 4,000 acres, 120 miles south of St. Louis and 25 miles east of the Iron Mountains. Ore was discovered here by La Motti, a French mining engineer, sent out by John Law, 1720. The ore is in stratified veins, disseminated through magnesian limestone; the veins are from 6 inches to 2 feet thick, and about one-third ore. Some 20 veins of this kind have been worked. The ore cropped out to grass, and was followed under shelving limestone until water set in, and then generally abandoned by the former miners, who hunted new places, where the ore was above water. The limestone is yellow and bluish, and nearly horizontal. The mines are on an area of 500 acres, and two miles from a low ridge of reddish porphyritic granite that crosses the property; the tract is partly a prairie, moderately rolling, and small groves of timber. Along this granitoid ridge, or dyke, a vein of lead, copper, cobalt, and nickel was discovered and worked some 20 years ago, the ore cropped out to grass near the porphyry, and dipped under shelving limestone, and was followed 100 feet with slight inclination; was disseminated 6 feet thick through limestone, the vein being one-fourth ore. This place was worked under a lease, which expired, and water set in, and ground was abandoned in 1855; this ore was roasted, reduced in furnace to regulus, and shipped East. At another place on this tract nickel and copper have been found in disseminated vein in limestone strata that lie nearly horizontal. This property sold two years ago for $600,000. The new company put up a large furnace and separating apparatus, and the last two years have worked some 300 miners, and produced about $1000 worth of lead per day. These veins are in the north end of a field or basin of limestone that is six miles wide and twelve miles long, and surrounded by several low porphyry knobs. The altitude of this district is 800 feet above the Missippi. These ores are probably the croppings, or surface ores, of the vein system of this basin, as ores of similar character have been found at several places in this field, but not mined except for a few feet in depth at the surface. The old lead mining town of Potosi marks the centre of another lead district—has 1000 population, is 70 miles from St. Louis. About 100 miners around this town work for lead ores in the clay that make from the grass roots to a depth of 50 feet. These ores are the sulphuret of lead, with matrix of baryta, or heavy spar, and are the croppings of floors of east and west and north and south pipe veins, that make in chambers under a cap rock, or rider, of basins of limestone. The deepest mining work done is 120 feet; one east and west pipe vein has been worked near town that was under 80 feet of cap rock, and yielded 3000 tons of ore.

Old Mines, Webster, and Richwoods are the other principal lead mining towns; from 1000 to 2000 acres around each of these towns have had the lead ores mined in the clay from the grass roots to a depth of 50 ft. This also is the croppings of basins of pipe veins, and these have been discovered and worked to some little extent. The lead field is lower Silurian limestone, tilted in basins, with a dip of from 5° to 15° with a plane of the horizon. These basins are from 100 yards up to five miles wide. The central part of basins has a cap rock, or rider, of 80 ft. of a fine-grained magnesian limestone, and above this a coarse brown sandstone. Faults occur in several places, the upthrow being 100 ft. and upwards. The sulphate of baryta, or heavy spar, crops out in veins and ledges, and forms in many places the matrix of the ore. The carbonates and sulphurets of zinc make more or less with the lead ores. In Franklin and Jefferson counties several north and south vertical veins have been worked. The Virginia vein was worked 2000 linear, and from 100 to 200 ft. deep, and yielded 6000 tons of 75 per cent. lead ore. The Mount Hope, Caswell, Cove, and other veins of that district were north and south vertical veins, and have been worked 100 ft. deep. The Sandy Creek lead vein in Jefferson county, 30 miles south of St. Louis, is a north and south vertical vein, is worked 1000 yards linear, and from 50 to 120 ft. deep, and has yielded 5000 tons of 75 per cent. ore. These north and south veins geographically are along the north boundary of the lead field; they continue downward, and the floors of pipe veins dip and rise with the centre of the basins. These mineral fields are in the east half of the south part of the State, south of the Missouri river, and bordering Arkansas. The part of State west of this line is called South-West Missouri, is largely lead, copper, zinc, iron, and coal fields, and includes 5,000,000 acres. The lead ores in the first-named field are in Lower Silurian rocks, and in the central and south-west part of State in Devonian and carboniferous rocks. South of Jefferson City the lead veins cut through coal measures, and cannel coal and lead ore are mined from the same shaft, the coal for mining the matrix of the lead ore. Copper ores have been mined in some ten places; the ores were the green and blue carbonates and yellow and grey sulphurets. The ores occur in both limestone and porphyry districts, and indicate both gash, pipe, and true veins. Zinc ores are mined in several counties. Carbonate sells in St. Louis at $16 per ton. The zinc ores make in stratified and pipe veins. Near Irondale the zinc is free from mixture with lead, and appears to form a kind of stock-werke vein, and gives evidence of working similar to the Vieille-Montagne Mines, in Belgium. Lead ore in the east part of the State sells at $80 per ton, and in the south-west part at $50 per ton.

The specular iron ores in Crawford and Dent counties make in immense fissures in Silurian limestone. The hills have a cap of sandstone, which is generally tilted over in the upper part of fissures, and forms a silicious and ferruginous "hat" for the iron veins. These veins are from one to three miles apart; the ore yields 65 per cent in the furnace. The field is very little developed, and includes 500,000 acres.

The tinstone of Missouri, and about which such a diversity of opinion exists among geologists and chemists, is a pale, greenish felspar, where the mica in the rock appears to have been removed and replaced by the oxide of tin. The American Tin Company, of St. Louis, own 2000 acres of land, including an oblong and conic mountain, known as Tin Mountain. This is 500 ft. high, above the St. Francois river, and 20 miles south-east of Pilot Knob. The company have expended about $150,000 in tunnelling this mountain and putting up tin furnace and separating apparatus. The formation of this mountain is a dove-coloured and reddish porphyritic granite. The tunnels are 100 ft. above each other, and cut from 100 to 300 ft. in a dyke of greenish and black felspathic granite. This is 190 ft. wide, and cuts the mountain vertically in a course 20° east of north, and is called the "Tin Vein." From the rock taken from these tunnels numerous small assays have been made, and from 1 to 5 per cent. of tin found. The company have two Blake's crushers, 25 stamps, revolving and other separating tables. The ore, when separated from the rock, looks like a fine black and brown sand. Twenty tons of stone, it is stated, can be crushed and separated daily. The furnace has been remodelled the last year.

It must be kept in mind that the parties interested in this enterprise had no knowledge of tin ores, mining, or smelting, and necessarily have had many difficulties to contend with, and much more money has been expended than necessary to find if the tin existed in paying quantities in this stone. My study of this district was limited to the general geology and physical character of the veins where exposed. Some 12 years ago tungsten was discovered in a large quartz vein in this district; also, I noticed several places where "stock-werke" veins of a dark ore occurred in dome-shaped masses of porphyritic granite. The threads of ore are from the size of a knife-blade to ½ in. thick, and disseminated in particles, and cross the rock in all directions. In a study of De la Beche's "Geological Observer" I found that some of the tin veins of Cornwall had this physical character, and supposed, as much as 10 years ago, that these must be the croppings of veritable tin veins. The district is mountainous sparsely settled, and no effort whatever has been made to mine or assay these croppings.

My study of the mineral fields around these iron mountains commenced in 1856, and survey has been compiled the last two years in 200 geological and topographical township maps. The area included is 5,000,000 acres; the work has been done at my own expense, and for the purpose of knowing something practical of the vein system of this region. The mind of the observer of such a great continental mining field as this is imperceptibly led to contemplate the rise and progress of the people who are to mine and bring these ores into the channels of commerce. The country is comparatively a wilderness, and contains 100 porphyry mountains; these rise through rocks of Cambrian and Silurian age. There is little or no sale for these lands, no mining system in St. Louis, except for coal and iron. Some of the quartz veins of this region are of a gigantic character, and physically resemble the quartz from the Comstock and other veins worked in Nevada and Utah. It does not need a prophet to foretel that in this region in the future is to be a vast mining industry. The dawn of the coal and iron mining is seen, that for the other ores must soon follow.

This area of 5,000,000 acres of mineral fields has the iron mountains near its centre, and rises like an island formed of azoic and palæozoic rocks, 100 miles wide and 1000 ft. high above the great sea of the coal measures of Illinois, North Missouri, Kansas, and Arkansas. The lead, copper, zinc, and silver-lead fields are in primary and secondary strata. The quartz districts are of the same general geological age and system as these iron mountains. It is here that the economic laws have massed the ores for supply of metals for that dense population who in the future are to shaft these vast coal basins, and cultivate the grand praries of Illinois, North Missouri, Iowa, and Kansas, that extend for 500 miles through the central part of the basin of the continent.

JOHN VAN CLEVE PHILLIPS.

Dubuque, Iowa, Oct. 6.

COPPER AND LEAD IN COLORADO.

SIR,—The mines of Colorado are well known to be rich in gold and silver, and copper and lead are also known to exist, but it is generally supposed in only limited quantities. This supposition is fallacious, however. It is well known that in order to successfully treat, by smelting, the rich ores of any country, sufficient copper ores must be used to form a copper regulus that will take up the precious metals; or sufficient galena ores to combine with the precious metals—the product being lead riches.

In order to lay before your readers some few plain facts regarding the richness of Colorado ores in lead, I will mention that many of the galena mines, which are low grade in silver, are not being worked, owing to the want of a market for that class of ore, although they have received sufficient development to demonstrate their great worth and value, whenever extensive smelting-works are erected, and a market established. As an instance of what the ores contain in lead, I will state that 11½ American tons of ore from the Mendota Mine, at Georgetown, shipped to Liverpool, gave a return of 51 per cent. lead, and 66 ozs. silver to the ton. This ore was merely hand-picked, not machine dressed.

In the statement of the Colorado Terrible Lode Mining Company (Limited) for September, I find that 2½ tons of jigged minerals from their 3d class ore, gave a return, at Liverpool, of 71 per cent. lead. It must be remembered that the 3d class ore from which this mineral was obtained could not possibly, previous to jigging, have carried over 10 or 12 per cent. of lead. All the ore from this mine is hand-picked, the 1st class, or that containing the largest percentage of silver, is shipped to Liverpool—150 English tons giving an average of 31½ per cent. lead; the 2d class sent to the amalgamating works for treatment, and the 3d class dressed in a simple jig. The Cashier Mine produces ore that is easily hand-picked to 45 per cent. lead and 150 ozs. in silver. The Stevens 1st class ore is rich in lead, from 40 to 50 per cent., and 200 to 300 ozs. in silver. The Paymaster carries over 50 per cent. lead, but is comparatively low grade in silver, from 30 to 70 ozs. to the ton. The New Boston, Muscovite, Henry Ward Beecher, and a score of similar mammoth veins exist in Clear Creek County alone, that will yield immense quantities of ore, from 10 to 50 per cent. galena, and from 20 to 60 ozs. in silver to the ton, and this, too, without machine-dressing, while in Gilpin County there are numerous others.

The numerous gold mines of Gilpin County and of Upper Union district, Clear Creek County, generally carry a large percentage of copper, sufficiently so to render them valuable as smelting ores. They are not copper ores, but gold and silver ores containing copper. The same imperfect mode of dressing the ores exists here as in the silver mines of Clear Creek County. About 5 per cent. of the ore yield of the mines is hand-picked from the total mass raised, and sold to the smelters, while the remainder, containing from 20 per cent. to 40 per cent. of equally as good mineral, is sent to the stamp mills for treatment. But by this imperfect mode of dressing sufficient data has been obtained regarding the amount of copper contained in the ore which can be readily used as a basis for those who contemplate the erection of smelting-works in that country: 20 English tons of ore from the Briggs Mine, in Gilpin County, shipped to Liverpool, gave a return of 9 ozs. 2½ dwts. of gold, 27 ozs. of silver, and 9 per cent. of copper to the ton. Many of the following results have been obtained in London from tests of ore from the following-named veins, all in Gilpin County:—Bobtail, 37 per cent. of copper; Lord Byron, 23 per cent. of copper; Rhoderick Dhu, 20 per cent. of copper; Pewabic, 23 per cent. of copper; Kansas, 5 to 9 per cent. of copper; Forks, 5 to 14 per cent. of copper; California, 6 to 13 per cent. of copper; Central, 7 to 15 per cent. of copper; Illinois, 12 to 29 per cent. of copper; Alps, 8 to 21 per cent. Mammoth, 6 to 20 per cent. of copper; Gregory, 5, 9, and 11 per cent. of copper; Gunnel, 6 to 10 per cent. of copper. When it is considered that these results are obtained by the expensive and imperfect mode of dressing (by hand) in use there they are simply wonderful.

In Jefferson and Boulder Counties are a large number of valuable copper mines, already sufficiently developed to demonstrate their value. These are copper mines carrying some silver, from 5 to 30 ozs. to the ton. The Commercial Mine gives 33 per cent. copper; Gregory, 37 per cent. copper; Malachite, 12 to 22 per cent. copper; Valparaiso, 18 to 21 per cent. copper; Partridge, 17 to 24 per cent. copper. Fluor-spar also exists in considerable quantity in the vicinity of these mines.

The above facts are sufficient to convince the minds of all interested that the mines of Colorado are not only rich in gold and silver, but also in copper and lead, but that a more economical process of dressing the ores is required. If such results can be obtained from the rough and loose manner of hand-dressing now existing there, where fully 30 per cent. of the mineral is lost in the remaining ore, what would be the result if the dressing-floors in use in England could be brought into general use there? It is certainly safe to say that with the proper appliances for dressing the galena ores of Clear Creek County, that county can alone produce at least 100 tons of smelting ore per day, averaging at least 50 per cent. of lead to the ton, while Gilpin County could do fully as well with both lead and copper.

(Of Colorado), Nov. 28. A. W. BARNARD.

AMERICAN FIRES, AND WELSH SLATES.

SIR,—From a statement in last week's Journal I find that "Chicago lost millions by having felt roofs," and that "Boston has just lost as many more by having wooden shingle roofs." I am glad to inform your readers that, notwithstanding the high tariff in America, the late advance in the price of slates in Wales, and the prospect of a further advance next January, there is an increasing demand for slates for America. Orders are coming in daily, and quarry proprietors have every reason to expect there is still a better time coming for them. The supply of slates is not equal to the demand. But new quarries will be opened, and capital invested for the development of the exhaustless resources of the Welsh mountains. I am sorry to say that immense sums of money have been spent in fruitless attempts to open quarries in districts where a bastard slate rock only is found, and not a real slate vein. But in Bethesda, Llanberis, Nantlle, and Festiniog there is an immense body of the best slate rock in the world, which only requires capital for its development to greatly increase the supply to meet the increasing demand for slates. The quarries which have been properly opened in the above-named districts are now paying splendid profits, and there is no reason to doubt that the undeveloped portions of these great slate beds would pay equally well.

A PRACTICAL QUARRYMAN.

AN AMERICAN'S VIEWS OF THE TIN MINES OF CORNWALL.

SIR,—I think it scarcely need be said that the letter which appeared in the Supplement to last week's Journal is a little too "smart," for even an American, to be allowed to pass unrefuted. Whether we look at it as a violation of the rules and obligations of hospitality, or as an exhibition of palpable inconsistency, or whether we regard it as a freak, or the legitimate expression of a licentious and unbridled conceit, and the self-reliance which usually accompanies that peculiar characteristic of would-be somebodys, it is alike reprehensible in its every form and feature, and is as unjust and untrue as it is ill-advised and intemperate. It may be proper for me to say, before proceeding further, that I know nothing of the Boscaswell Downs Mine, except only in name; nor anything of the agents, nor of anyone else connected with the establishment, and that whatever remarks I may make concerning it will be made from facts stated in that very singular communication of an American.

It will not be my province to assert that Cornish mining is perfect, as a system, but merely to review what I cannot but regard as a very vulnerable, as well as reprehensible, article, and leave the results of Cornish mining to testify in favour of or against itself. One thing I may premise before proceeding further, and that is that Americans of the type of the one now before us cannot be entrusted with the freedom and privileges of Englishmen without abusing them. Allow me to say, Sir, in this connection that the privilege of expressing one's views through such a medium as your widely-extended Journal cannot be had in America for the asking; and hence money and privileges are interchangeable commodities, and one invariably bespeak the other.

If England were behind the age in mechanical genius, or in literary or scientific attainments, or if in point of morals the English were inferior to any other people, some conceivable ground (or, more properly speaking, some excuse) for the intemperate attack of an American might, with some show of decency, be alleged. But as it is, I am fully convinced that not the shadow of an extenuating circumstance can be found, either internally or externally, as it relates to mining in Cornwall in comparison with any other parts of the world, in favour of the conduct and action of Mr. Baker; and, therefore, and because of its general untruthfulness and one-sidedness, it will not, I think, fail to be pronounced and stigmatised as an unmitigated libel.

Personally, I look upon this display of Mr. Baker as an embodiment of consummate ignorance. An ostentatious parade of words—pretending to knowledge whilst utterly regardless of their relevance or otherwise. And if I fail to make good this position in my remarks on his letter, according to the judgment of an impartial public, I will at once most fully and amply apologise for the error I may have committed by its undisguised acknowledgment and unqualified retraction.

In his description of the mine to whose manager he had gone with a letter of introduction—very probably from the pen of some mutual friend—and by whom he was so well received and entertained, he states that it is 200 fms. deep, and that the average yield of the ores as brought to the surface is 20 lbs. of tin to the ton of stuff, and which, at 80*l.* per ton for black tin, he has set down at 26s. per ton in the stone. But by what process stuff producing only 20 lbs. of black tin per ton, and for which—black tin—only 80*l.* per ton is realised, can be worth 26s. per ton in the stone I cannot make out, nor do I think anyone can who may take the trouble to look into it. According to my interpretation of the language of figures, 100 tons of stuff yielding 20 lbs. per ton would give exactly 2000 lbs., which, divided by 112, is equal to 17 cwts. 3 qrs, 12 lbs. of tin, which, at 80*l.*, would be worth 72*l.*, and that, divided by 100, gives 14s. 3½d. as the value of the ore per ton. The vein, he states, never exceeds 3 ft. in width, and is often less than 2 ft.; I shall, therefore, assume that an average of 2 ft. in width will be sufficient to comprise the productive parts of the mine, and from the nature and composition of the lode, this would yield about 5 tons per fathom, which, at 14s. 3½d., per ton, will amount to 3*l.* 11s. 4½d. per fathom. This is given as the average value of the ore-ground throughout the mine, but what the proportion of poor ground sunk and driven through is to the productive ground is not stated, but we are left to infer from *ex parte* and garbled statements what is the real condition of the mine and its management. And here we have the clear and unmistakeable basis of 3*l.* 11s. 4½d. as the average value of the productive parts of the lode throughout the mine, and from which all the expenses of working have to be paid and profits made,—the latter, of a modern period, Mr. Baker states, amounts to 300,000*l.*, besides the enormous, or ruinous, waste sustained—asserted but not proved by him.

It would seem that the frequent repetition of process in the dressing department outraged all his ideas of economy, and this, heightened by an anterior prejudice against the Cornish steam-engine, may be presumed to account for the fit of spleen which afflicted him and culminated in such a paragraph as the following—"Here are buddles, concave and convex, launders innumerable, slime pits and *coffers*, tossing tubs and *keeves*, frames and thumpers, shovels, scrapers, and slush everywhere. Men and women, boys and girls, do the work and escape insanity because they know nothing but the names of things and the routine. An attempt to understand the *rationale* of the proceedings would end in dementation. Repetitions, divisions, re-doing and undoing, shovelling and re-shovelling, putting in and taking out, tossing and framing, here a little and there a little, *ad infinitum:* and all this according to the perceptive powers of our sagacious informant—more accustomed, we presume, to the ringing of changes upon words than the comprehension of facts and business ideas—for the purpose of raising the produce of the ores from 20 lbs. of black tin per ton as brought from the mine to 33 lbs. per ton as handed to the smelter, and for which he states 80*l.* per ton is paid. I fancy the miner would be but too glad if our informant's rendering were correct, but, unfortunately, he immediately adds—"Hence it will be seen that 100 tons of average ore is worth about 130*l.*" It will be remembered I have already shown that it would be worth only 72*l.* The senselessness of such twaddle would be sufficiently apparent without any further remarks from me.

It might be interesting to enquire what methods of mining and concentration are practised in Colorado. I remember a series of letters which were published some time since in the *Scientific Press* of San Francisco from the pen of a Mr. Paull, detailing the methods employed in Colorado for reducing the ores to bullion by amalgamation, and the conclusions to which he arrived by a comparison with California and Nevada was anything but flattering to Colorado. The conservation of ores when broken from a mine is as important a branch of mining economy as any which are connected with it, and one which baffles the scientific as well as the skilfully practical man. What can be done to prevent the waste of metallic minerals when reduced, as much of them unavoidably come to an impalpable powder, is a subject that I shall not enter into on this occasion, further than to say it is a question more easily asked than answered; and this it is which gives rise to the constantly recurring process in the concentration of tin; and until an American was prepared to suggest, at least, some improvement in the general practice common prudence should have dictated silence. But if he were prepared to deal with this difficult question by the introduction of any effective method of his own, he might much better employ his time by putting it in operation in his own country. There is a necessity there, for all that he knows, or ever will know, of any and every department of mining. I have only recently returned from America, after a residence of 7½ years in the Western States, and I now fearlessly affirm that the best mining I have ever seen there, outside the works under my own direction, were at those few places where the Cornish methods were most faithfully upheld. And when the question of utilising the products come to be considered, I need only refer to

Mr. J. Ross Brown's report of the mineral resources of the United States for the year 1868, which shows that one of the large mines—the Hale and Norcross—sustained a loss in the working of their ores by amalgamation in one year of $762,516·04. The assay value of the ores treated was $2,117,736, and the amount realised was $1,355,220·40, showing the enormous loss as above, which on the silver product was about 48½ per cent., and 15 per cent. on the gold. Some time before I left Nevada I examined a mine in which a hole, dignified with the name of shaft, was being sunk 140 feet below the surface. At 100 ft. down a very perceptible bend took place in the shaft, occasioned by the intersection of a fault, which displaced the lode. At this point a windlass was erected, and another at the surface; each of these was operated by two men, whilst at the bottom one man only was engaged in breaking and filling the stuff. Here were four men employed to remove the stuff broken and filled by one man. There was yet another man at the surface—a sort of scare-crow, paid, one would think, to practice rigidity of his limbs, look gruff, and answer any visitors who might ask questions uncivilly.

I visited the same establishment again some time afterwards, and when the hole had been sunk deep enough below the second windlass for another level, and I then found in addition to the above, but in striking consonance therewith, a man supplying the windlass men with the *debris* broken in the level referred to by the help or instrumentality of a 20 lb. candle-box, a vehicle which might contain two ordinary shovelsfull of dirt, and the same thing might have been continued until this time if I had not suggested the convenience of superseding that very primitive method by the wheelbarrow. A more extensive idea of American mining may be gleaned by a further reference to Mr. Brown's report, from which we have already quoted. And there it may be seen that the sinking of the Bonner shaft of the Gould and Curry Mine cost something like 100*l.* per fm. for upwards of 100 fms., whilst the average cost of driving the 200 and 400 ft. levels, together 600 fms. in length, was 20*l.* per fm. The cost per ton for raising and reducing the ores from several of the largest mines is given at 5*l.* 2s. 6d. But what this will amount to per fathom it is difficult to say, as the ores usually occur in large bonanzas or chambers, and the area can only be properly expressed in cubic fathoms. A cubic fathom of such ores would yield 15 tons, which multiplied by 5*l.* 2s. 6d., amounts to 76*l.* 17s. 6d. per fathom. But this, of course, includes all the cost of milling and mining, yet does not enable us to ascertain the actual cost of mining and milling 1 fm. of the ore ground. To do this the proportion of poor ground to the good must be known, and of this we have no information. Sufficient, however, will be seen to enable us to perceive the very great difference between the two establishments, one of which yields ore to the value of 14s. 3½d. per ton, and the other requires 5*l.* 2s. 6d. per ton to pay the expenses, irrespective of any lord's dues, to which the former is liable. I think an intelligent and unprejudiced public will experience no difficulty in deciding that any mine of the magnitude and character of the Boscaswell Downs which can meet the expenses incidental to three working shafts and six steam-engines, on orestuff the average of which does not exceed 14s. 3½d. per ton *in situ* cannot be a badly managed mine, nor admit of many appreciable avenues of waste. I regard this manifest attempt to disparage on the part of our American friend as the highest compliment unwittingly paid—if that were of any worth coming from such a quarter—to Cornish mining in general and to Boscaswell Downs in particular that the most ardent Cornishman could reasonably desire.

Liskeard, Nov. 17. ROBT. KNAPP.

N. ENNOR ON SPRING STAMPS.

SIR,—In reply to Mr. Willoughby, I am only sorry at his taking offence respecting my former remarks on the spring stamps; I thought after his spending 1600*l.* upon trying his hand at stamps building, he would have been silent until he had brought his recent new one to perfection.

When at the Polytechnic meeting I was rather taken by surprise after the awards were made to see him bring his model there, and a friend to lecture on its capability, and particularly so after I had visited his place at Plymouth and examined his stamps, and told him it was useless to take it to any mine. I also wrote to the mine agents and told them what the result would be, but it had no effect; they passed it on, put it up, and came to Falmouth to give a lecture upon its capabilities. It so surprised me that I stood aghast at my own judgment, and left to go to the mine to see for myself. When I arrived I could not find the stamps, but on enquiry I was told that "the crows had carried it off." Since then I have seen reports as to its efficiency, and that it was going to stamp out 3750 tons of tin in 300 working days; this looked to me to have done away with the term, often used, that a step in the right direction, if true here, was a fact, and a something that may pay back the 1600*l.*, or, at any rate, the interest of the money.

Being on a tour round the county, I strolled into the mine to see if it was the same stamps which I had been told the crows had carried off; when I came there, to my surprise, there were four new ones, quite, I may say, upon a new plan altogether. Not a vestage of the stamps so highly praised at the meeting is there. These stamps are all upon a new construction, I must say very much improved upon those the crows are said to have carried off, but even these are a long way from being perfect yet. Mr. Marten appeared life and soul in it; he all but lived in the stamps-house, waiting every move to detect its defective points. I do not know which to give the credit to for the improvement, whether to Mr. Marten or Mr. Willoughby: be who it may, they have a hard battle to fight to get a gain of power out of springs, without which I fear the crows may may call round again.

I say all these new stamps are a step in the right direction; persevere, and try what can be done to exterminate the old drudge of a stamps—a Cornish engine. If I am the hinder dog I am not out of heart; I shall come again in due course. I have seen most of the new stamps out, and I see room for improvement in all, and can improve every one of them; there are three or four more to come yet, but parties are holding back, and requesting me to look at them first. From the multitude we shall surely get a something to aid the legitimate tin miner, and I hope a something which will permit a good portion of 50,000*l.* worth of tin annually going down the Red River from some six or eight mines. N. ENNOR.

IMPROVEMENTS IN STAMPS.

SIR,—So many improvements in stamps have recently been brought forward, and these based upon principles so entirely opposed to each other, that miners may well decline to adopt any of them. Most of the inventors have merely claimed that their own stamps are the best that have ever been made, and when asked why they are better have had no other reason to give than that is "because they are." Now, although practical men pretend to despise science, it is almost invariably found that they have some crude ideas of scientific principles, and that they are much more ready to believe a statement which can be supported by scientific evidence than one which cannot, and they do not place that implicit confidence in fellow-practicals which is sometimes supposed. There is little question that the old-fashioned Cornish stamps cannot be surpassed in principle by any of the inventions which have been proposed for replacing them, but that they are perfect—that is, that they are incapable of improvement in detail—few would even attempt to argue. Every practical miner knows that one battery of stamps will get through the same amount of work, with less power, than another even on the same mine; and although sometimes they cannot account for this, the fact remains the same.

It is a mechanical impossibility for springs, air-chambers, or levers to increase the power of stamps in the slightest degree, and the introduction of them has the additional disadvantage that they increase the number of parts liable to require repair, and frequently necessitate absolutely more power, because they produce more friction. The number of parts in the Cornish stamps is fewer than in any other machine for a similar purpose; but in saying this, I include as Cornish stamps all which differ only in the shape of the cam, head, shank, or lifter: thus, I should call Walker's stamp, recently described in the *Mining Journal*, as a Cornish stamp, and whatever improvement it may contain is a mere improvement in detail. Of course it is these improvements in details that finally lead up to perfection, but still it is absurd, because a detail is improved to assume that it is no longer a Cornish stamp. Cornishmen well know that the higher fall they can obtain the greater will be the crushing force of the same stamp-head; but they also know that more power is frequently consumed in getting the additional crushing force obtained in return; this is the fault with the lever stamps. In the case of the spring-stamps and air-stamps the objection has been that the additional crushing force obtained is not equivalent to the extra power consumed in compressing the springs, or air, as the case may be.

With regard to the difference in the economy of different batteries of Cornish stamps I venture to assert that it is entirely dependent upon the amount of friction between the cam and the cap, or lifter, and the closeness of the shank to the axle. When an old-fashioned cam is used of course the friction is great, but usually lessens as the cam becomes worn; and even in the best constructed curved cams by far too little attention is paid to exact shape of the curve, which can be so formed that the friction between it and the lifter is absolutely inappreciable; because a different part of the curve is presented at every portion of the lift. The other important consideration is to reduce the thickness of the axle as much as is compatible with retaining sufficient strength, because by this means the leverage is reduced, and consequently less power is required to work the stamps. Let miners pay attention to the axle and cams, and I shall be much mistaken if the Cornish stamps leave anything to complain of

Nov. 26. C. E.

WHAT TO SELECT—WHAT TO AVOID—No. XXXI.

SIR,—The inate condition of the mining market, peculiar to this season of the year, affords the investing public many favourable opportunies of acquiring an interest in well-appointed and established mines upon most advantageous terms. Twelve months have elapsed since the writer stated that to the judicious investor 1872 should prove a profitable year, and the results have verified his anticipations. The reaction is now again apparent, and as is usual during such a period values decline far below the actual worth of the respective properties represented. Therefore, the present is another opportunity for investors, which should be availed of before the inevitable improvement sets in.

ASSHETON MINE.—Some time since the writer drew attention to the improving position and prospects of this mine, and it is highly gratifying to find that his expectations are being fully realised, the profits upon the last month's operations amounting to 450*l.* from the sale of 60 tons of lead. The reserves are being gradually increased, and the various points of operation continue to open up rich courses of ore, justifying the statement made some few weeks since that Assheton will at no distant date be placed in the category of the most successful lead mines in the Dividend List. The aggregate market value is 48,000*l.*, or 12,000 shares at 4*l.* each.

EAST VAN.—The correctness of the opinion expressed by the writer, in 1871, as to the early success of this mine having been called into question, he feels bound, in justice to himself, to state that that opinion was based entirely upon the confident expectation of the manager that discoveries would be made in the adit driving west towards Van, which, up to the present time, has not been realised; this, added to the fact that the 25 cross-cut has thus far been a disappointment, has proved very discouraging, which no one can possibly regret more than the writer. In the various communications upon the subject attention is oftentimes directed to the fact that East Van, at 7*l.* per share, is selling at an aggregate market value of 105,000*l.*, while the world-famed Devon Great Consols, although it has paid in actual dividends 116*l.* per share, is selling in the market for 72,000*l.*; that the equally famous South Caradon, which has paid 694*l.* per share in dividends, and now paying at the rate of 12,288*l.* annually, is selling for 102,400*l.*—or, say, 3000*l. less* than East Van; and East Van is selling for about eight times more than the productive Herodsfoot; that Providence, which has paid 104*l.* per share in dividends, is selling for only 22,400*l.*; that West Wheal Seton, which has paid 79*l.* per share in dividends, is selling for 24,000*l.*; that Wheal Kitty (St. Agnes), which has paid 9*l.* 8s. per share, is selling for 60,000*l.*; and that Wheal Basset, which has paid 638*l.* per share in dividends, is selling for 36,000*l.*, or 69,000*l.* less than East Van.

The writer is often asked to explain this extraordinary anomaly, and to show the reason why a mine in only a progressive condition, without one ton of ore discovered, should be of an aggregate market value considerably greater than the richest and most permanent dividend-paying mines in Cornwall. The answer is obvious to the few, although probably enigmatical to the many. It is such points as these that the investing public would do well to duly weigh, for it is only by making similar comparisons to the above the intrinsic value, either as an investment or a speculation, can be determined.

There can be no doubt that East Van, when developed to a greater depth, may prove successful; but seeing that it is already selling at 105,000*l.*, it is only a fair assumption that any discovery that can be made is already fully discounted in point of market value. This is the more evident when it is remembered that Van itself, although it had returned 2240 tons of lead, which realised 28,500*l.*, was sold to the present company for the sum of 45,000*l.*

Pinner's Hall, Nov. 27. FREDK. WM. MANSELL.

CARDINHAM SILVER-LEAD MINE.

SIR,—I see in the Journal of Nov. 16 a prospectus of the above mine, situate in the parish of Cardinham, Cornwall. The area of the sett is extensive, and in it there are several ascertained lodes warranting the expenditure of the capital now being raised for the purchase of the mine and for its exploration. The water at command for motive-power is an important circumstance in favour of the company. From the information received from those who know the mine intimately, I am sanguine as to the beneficial results of working. There is a respectable directorate, and a local managing engineer (Mr. J. H. James) of scientific experience. It is probable that the working of this mine will originate a *District*, properly speaking, of mines in that locality, which has been too much neglected, being so far east of Truro Bridge. I wish the company a realisation of their fair prospects.—*Truro, Nov.* 25. R. SYMONS.

MINERAL LESSEES ALIAS "SQUATTERS."

SIR,—Someone has said that 1000 years will wear out any living language. How far that assertion may be true I will not pretend to determine; but I see, on looking into books 300 years old, that a considerable difference has arisen in the composition of modern English. Many words then in use are now obsolete, thousands of new words have been introduced into our vocabulary, and many words have varied in their meaning and orthography: so much so, that a reader of an old book of that date cannot readily, in some cases, apprehend the author's meaning. Many words are now used in *new senses*—for instance, "Squatter" originally signified "one that squats, or sits close," like a man hiding himself from observation behind a low fence. How the word became to mean in America "one who settles on new land without a title" I am at a loss to conceive, unless the settlers were supposed to settle on the land in a *stealthy* way. "Student" says that "Argus" was quite correct in applying the word to the tinworkers on the Red River. He says, "In Australia a squatter is one who leases or purchases a large extent of territory, converting it into a sheep-run," &c.; and because the word is so used in Australia he takes it for granted that we must adopt it in England for tindressers, because they too have a lease. He sees, I suppose, an analogy between a sheep-run and a tin-stream. If the term is admitted to apply to the streamers it must be admitted to apply to the lessees of mines, and to all the shareholders, because they stand in a position analogous to the streamers, being lessees like them, Now, if the word is to be Anglicised I may expect to see it used by pursers of mines and by mine managers in their notices of mine meetings, in the following manner:—"A meeting of the squatters in Dolcoath Mine will be held on the — day of ——, at 12 o'clock." "At a meeting of the squatters in Tincroft Mine (Mr. W. Teague in the chair) it was resolved," &c. Such announcements would sound oddly, and create amusement in some cases and offence in others. I, for one, object to its introduction in the sense referred so. It is a word just fit to be put in juxtaposition with "humbug," which no polite writer, I think, would use. Of course "Argus" can please himself.

"Student" is in error in stating that the tindressers in Red River Valley "are not in a position to avail themselves of the most modern approved appliances for their work." They are, I understand, at great expense providing the very best appliances for extracting the ore from the *debris*.—*Truro, Nov.* 25. R. SYMONS.

NEW GREAT CONSOLS.

SIR,—About half a century ago the then manager of Dolcoath Mine (not Capt. Chas. Thomas) was requested to give his opinion on a mine proposed to be worked southward of Carn Brea. I cannot say *which* of the mines it was, but I think it was either Wheal Basset or South Frances. His report was to the effect that "there was not copper enough in that side of Carn Brea to make a penny." The results of mining there have clearly evinced the fallibility of the good miner, for it was generally admitted, I believe, at the time that Capt. Petherick was a good miner. What have been the results that Wheal Basset, North Basset, Wheal Buller, South Frances, West Frances, and East Basset, have yielded more than a million profit and ores in the gross probably of three millions!

When Capt. Rd. Pryor took the management of New Great Consols he took it as a copper mine, for it had been worked as such by two preceding companies, under the names of Wheal Martha and Great Wheal Martha. He meant to open the lodes more fully than his predecessors had done, in search of that mineral—returning also a large quantity of mundic. His experience as a searcher after mineral wealth should never be forgotten by existing or future managers. While his attention was directed to the copper it occurred to him to test the contents of the lodes for tin, and what did he discover? that tin was everywhere, in the lodes and in the debris! Every stone in the burrows appears to contain tin, and as regards the lodes, I may safely say that they are practically inexhaustible. I believe that the mine will favourably compare with the celebrated old rich Dolcoath. At the present time the returns of tin are about 22 tons per month. The number of stamp-heads—lately 32 or 36—have been increased to 60, so that the returns will also increase; and when the number of heads shall be made equal to that of Dolcoath (about 300 I am told) the returns will doubtless exceed those of Dolcoath, because the contents of the lodes are richer—the percentage of tin greater.

The manager, in his report, says:—"It is now about three years since we commenced our operations for working the mine for tin. Since then we have laid out and erected the whole of our surface plant for stamping, dressing, &c., and returns from the commencement of working the stamps, about two years ago, 347 tons of tin, realising nearly 26,300*l.*, with 2450 tons of arsenic, producing 5750*l.*; amounting together to 32,050*l.*" The slimes, containing a large quantity of tin, are still entirely undressed, but accumulating on the surface. The manager says:—"We shall now proceed to dress our leavings tin, and shall gradually send it to market with our monthly parcels."—"The breaking of one of the driving axles of the stamps, thereby causing 36 heads to be idle for nearly a month, threw us nearly a month's tin behind."

The steam machinery on the mine consist of a pumping-engine of 80-in. cylinder, a 22-in. winding-engine, and crusher attached; and a 36-in. stamping-engine. The other mechanical contrivances for metallurgical purposes would require more time for their description than I have at command between this and the posting hour. I will, however, enumerate a few of them. There are six of Brunton's calciners, 14 ft. diameter, water-wheel to each. About 30 round buddles worked by wheel, several square buddles, about 80 frames, and "strips" for 24 of the stamp-heads. There are 3600 ft. of flues, and chambers 24 ft. long, 6 ft. high, and 3 ft. wide, for the proper condensation of the arsenic, together with a duplicate set of flues and chambers measuring 4800 ft. There is a large house capable of containing about 150 tons, or one month's produce, of arsenic. Three years ago, when I surveyed the mine, the field, containing 7 acres, opposite to the account-house, was arable land. It is now literally covered by buildings and the numerous appliances for dressing the tin. Such a change, in such a period, is most singular, and shows the industry with which the erections were conducted. Mr. Rashleigh, the contractor for the masonry, did more work in the time than but few in the county could do, and has done it to the manager's satisfaction.

I did not visit New Great Consols as a reporter, but, being at the mine on business, I visited the several points of operation underground, as well as the works at surface, and was really surprised to see such large excavations on the lodes, and the lodes so generally rich. I had seen nothing equal to them before. Tresavean lode was large, but not equal to these. I do not pretend to be a good estimator of what the miners call "ends" and "stopes." I will, therefore, refer your readers to the manager's estimate, which, no doubt, will be inserted in your Journal—if not already there. The results of working New Great Consols for tin show the presumption of those prophets who said about three or four years ago that there was "not a pocket-full of tin in the mine." It was said unadvisedly and in "haste." The company very properly expended a tolerably large capital in their preparations for returning the tin, and now that nearly all the necessary appliances are perfect—except as regards their extension—they will reap the benefit of their outlay. I congratulate them on their success. I congratulate, also, Capt. Pryor, the indomitable, persevering manager, on his deserved success here, and at his other mines.

Truro, Nov. 28. R. SYMONS.

ON THE MINES OF CARDIGANSHIRE—No. II.

Cwmystwith.—In resuming from my letter, which appeared in the Supplement to last week's Journal, I will first describe that which was the opinion of Capt. Matthew Francis that the main body and the bulk of the great courses of lead ore wrought so successfully over the different adit levels, from time immemorial, down to the expiration of Mr. Lewis Pugh's lease, would be found at a certain point indicated by him; and if his judgment proved to be correct it became apparent that to work it with vigour and dispatch, as well as economically, an engine-shaft should be sunk so as to take the lode or vein at a certain depth beneath the bed of the River Ystwith.

The engine-shaft, Francis's, was commenced as advised by Capt. Francis, but the wash from the bed of the river filled it, and the ground or rubbish they had to go through, together with the difficulty of water, drove them from the work on more than one occasion, and it was not until the superintendence of the work was completed, under the eye of my late brother, that the difficulties were overcome. In sinking Francis's engine-shaft, and opening east and west, as proposed, his judgment was found to be accurate, and very rich courses of lead ore were laid open, and the mine put into a rich and prosperous a state of working as could be reasonably desired. In consequence of the failure of Messrs. Gower, the management did not long continue in the hands of Capt. M. Francis but reverted, like the Lisburne Mines and the Goginan, after he had brought them into a most flourishing and profitable condition, into the hands of Messrs. John Taylor and Sons, who for some years raised about 150 tons per month, and gave large and regular dividends; this quantity, however, began gradually to diminish, until at the present time the returns from the old workings, principally got on tribute, are no more than 20 tons per month; so that the working of the mine is attended with considerable loss, and this, once the richest and best mine ever opened out in Cardiganshire, has receded from the "Dividend" and entered the "Calling" List. That one day Cwmystwith will be worked as profitably as ever it was worked I firmly believe, and in order to get at the desired result greater depth must be attained.

The next mine spoken of is Logylas, which is one of the Lisburne Mines, where, in a few months after Capt. M. Francis took the lode management, by extending an adit level driven about 360 fms. to the old workers, to cut the Logylas lode (and which, it was supposed, had been cut—the former company having found a branch of the lode containing good lead ore), it was found by dialling that the *real* Logylas lode stood about 7 fms. further south than the cross-cut had been extended. The cross-cut was, therefore, immediately driven into the lode, where one of the best courses of ore ever discovered in the county was cut into, and from it the Logylas for more than 25 years continued the richest and most profitable of all the mines worked in that grant.

From various causes, however, the principal of which may be considered the *non*-deepening of the mine, the returns from 160 tons monthly are now reduced to about 20 tons, the greatest part of which is obtained from the halvans and old slimes on the surface and dressing floorings. I may say of this that, like everything else, unless ground is opened to correspond with the ground taken away, or rather if a larger return is made monthly than ore ground opened, it must come to an end. I will, therefore, say no more than that on the subject, that when we consider the deepest mine wrought under sea-level in the county is not 100 fms., we may rest assured that all the mines now fading away will, at no distant period, be worked on a greater and better principle, and that this group of mines will see a day of prosperity such as they have never yet seen, and will be surpassed by but few lead mines in Great Britain, or perhaps in the globe.

We next come to Grogwinion, which Capt. Francis supposes to have yielded, up to 1851, 250,000*l.* worth of lead ore. This old mine was worked very successfully about a century ago, by Sir Thomas Bonsall, and from it he derived a handsome fortune, as the landed property held by that family in this neighbourhood fully attests. Since Capt. Matthew wrote the mine has only been partially worked

and the old workings, which are most extensive, have never been cleared to this day. The returns made since 1851 have not been great, probably about 150 tons of lead ore annually. It is now in the hands of a London company, and in my next I hope to give you some further particulars respecting it. ABSALOM FRANCIS, M.E.

Goginan, Aberystwith, Nov. 25.

ROYALTIES IN CARDIGANSHIRE.

SIR,—The following letter appeared in the *Aberystwith Observer* of last Saturday; and, published under the very noses of the land and mining proprietors, foreshadows a discussion upon an important element in our prosperity, that I venture to ask you to further the consideration of the subject by giving the prominence of its reprint in your widely-spread Journal.

The question introduced is, Sir, of importance in more respects than one, for if the evidence adduced of inefficient mine trials have even a semblance of truth, it will elicit the facts then if those have arisen from excess of royalty, it will not only speak volumes to the lessors of mineral property in this county, but will justify a stand-up-fight by the lessees for "reducible royalties for increased depths."

Nov. 27. ONE INTERESTED.

SIR,—You will favour me by calling the attention of the landed proprietors, and the community at large, to the following subject, as it is a very important one to some thousands of the inhabitants resident in this county.

In the year 1851 my late brother, Matthew Francis, after describing the mines of Llanfair, Rhydtalog, Esgairmwyn, Cwmystwith, Logylas, and Grogwinion, also Esgair Lle, Nantyeria, Bodcoll, Ystumtyhen, Penrhew, Rhiw Riggos, Erwtomen, Gwaith Coch, Gelli'reirin, and Tyllwyd (particulars of which I hope to forward you at no distant date), went on to say—"We next approach the main silver districts of Cardiganshire, amongst the mines of which we find Goginan, Bwlch Cwm-erfin, now Bwlch Consols, Pwll'rheneid, Ceunant, Pen Craig Lle, Cwm Erfin, Cwm-symlog, Darren, Cwmsebon, and Bronfloyd. I consider these mines capable of yielding, if properly worked, 250,000 ozs. of silver annually, and 70,000*l.* worth of lead. I should take their total produce to have been 1,500,000*l.* for lead, and 1,000,000*l.* sterling for silver, or 5,500,000 ozs. The whole of these mines have yet been worked to a shallow depth."

Since the time that this was written the mines alluded to have yielded a much larger quantity both of lead and silver than they had done up to 1851, although none but Bronfloyd has been carried on in a miner-like way, and with the spirit that mining in the district should in every instance be managed. I do not mean to insinuate that no trials have been made, for at Cwmsebon, or South Darren, the mine has now been sunk to the extent or depth that their present machinery will permit of; but whilst the mine is giving profits, which is now the case, is the proper time for erecting the necessary requirements to give the mine a fair and proper trial.

Bwlch Consols, too, have made some trials, still not half that energy that is displayed in the Cornish mines is to be seen even there. Pwlltheneid, Caenant, and Pencraigdu, have remained unwrought and useless to the parties to whom they belong, as well as to the community at large.

Of Goginan, once the pride of this district, I extract from the *Mining Journal* of Nov. 9, 1872, the following:—"Goginan Mines Company (Limited), 6, Queen-street-place, London, E.C. Notice is hereby given, that an extraordinary general meeting of the shareholders in this company will be held at this place on Tuesday, the 10th day of December next, at 12 o'clock precisely, when a resolution will be proposed to dissolve the company, and to wind it up voluntarily under the provisions of the Companies Acts, 1862 and 1867. (Signed) John Taylor and Sons. Dated this 8th day of November, 1872."

Cwm Erfin, which up to the last few months stood the first or second in this district as a profit-giving mine for very many years past, has not a man at work, the affairs of the company having been wound-up voluntarily, as is now proposed to treat the Goginan. The Cwm Symlog, or East Darren, is now only returning one-half the quantity returned two years ago, and the Old Darren but a trifling quantity, and that principally from the refuse or supposed waste left by the old workers.

That a great deal of this has been brought about by the mines being improperly worked I think will not be attempted to be denied, as neither of the engine-shafts at Goginan or Cwm Erfin had been sunk for many many years past. Neither has Cwm Symlog Mine been deepened for many a long year.

In all the mines named a new system of working will have to be proceeded with, and more powerful and extensive machinery employed, or no good results may be anticipated from them; and I believe before capitalists will be found to embark their money in order to carry this out they will require from the landowners a very different rate of royalty. Already this has been conceded all through the county of Cornwall, and in the Derbyshire mines, which I visited about three weeks since, I found the royalties to be 1-25th, with no damages of any kind to be paid by the mining company.

I can venture to assert that since my late brother started and took the local management of the Goginan and Cwm Erfin mines, the landowners have received from ground damaged (certainly not to the extent of 150*l.*) the sum of 60,000*l.* for royalty or dues. In a great measure, therefore, the prosperity of this county as a mining one will depend upon the liberality of the landowners; and if they consult their own welfare, they will at once attend to the suggestions herein thrown out, or in a very few years they will be in receipt of nothing. ABSALOM FRANCIS.

Goginan, Nov. 20.

GLAN PEDROR MINE, NEAR ABERYSTWITH.

A long acquaintance with the district wherein this property is situated, and knowing something through shareholders of the manner in which their money have slipped through their fingers, I am induced to offer them a little consolation; if it is received in that light I shall consider myself amply paid for being the medium of throwing even the straw to the almost wrecked ones, an intimate friend of mine having spent an equivalent of 50*l.* per annum.

A meeting of shareholders is convened for Dec. 3, and for the perusal of any or the whole, I beg to state that if the money subscribed had been applied as intended, to work the property in a mining-like manner, the shareholders would not have considered it lost. The local situation is not a bad one, being almost equidistant between the Goginan and and Lisburne mines; there are lodes impregnated with lead ore, and undoubtedly there are others to be found if properly sought after; and I cannot see any tangible reason why these lodes shall not prove rich if fairly explored. The Llandiloes district was not held in very high repute until the discovery of the Van; and the same mode that discovered the riches of that mine I would suggest being done here; the facilities are almost identical. A cross-cut from the base of the hill would cut the whole of the lodes; this could be carried out by six men (say), at a monthly cost of, including everything locally, of 30 guineas per month. I think if I had spent, so heavy an amount I would try one throw more, especially under such easy auspices. JOHN TREVETHAN.

Mus Bangor, Aberystwith, Nov. 26.

"THE APPROACHING PANIC."

SIR,—Fallacies live long, and die slowly. We are never certain, indeed, when a fallacy is dead. A lie, it is said, has no legs; but certainly a fallacy would be better if it had, since it manages to wriggle about, like an eel, long after it has been skinned, and contrives to restore itself, joint by joint, like the tape-worm, if only its head remain intact. But, of all fallacies, those which misrepresent facts relating to value deceive most, and die hardest. Pronounce a property exceedingly rich, and you have spoken one of those charm-words which are common to all languages, and which delude, and perpetuate the fallacy, as amber does an insect, and lime-stone an animal. Fallacies have their use. They teach men to avoid many wiles which otherwise would find acceptance amongst them, were they presented to the mind in less glowing and extravagant terms. We can only prove their falsity by examination and enquiry. And yet, after repeated lessons of failure and bitter disappointment, some men will be found who are always ready to place implicit confidence in the most incongruous and inconsistent statements, provided the alluring bait held out be the acquisition of wealth. Upon this basis of ready credulity projectors of impossible schemes and promoters of bubble companies work, with full assurance of winning their reward. These attempts at peculation and fraud would be harmless if capitalists would exercise ordinary discrimination and prudence; but with eager haste they endorse the tale by fancy bred, and eventually find themselves sadder, if not wiser, men; whereas these same speculators will give no heed to a feasible adventure which is advocated in truthful and appropriate language, and reluctantly, if at all, invest any portion of their capital.

The suspension of operations at the Virtuous Lady, the King, and the Queen Mines has brought to our notice the death of a huge fallacy. We do not deny but that in each of these mines there were elements of success, and indications which would warrant careful and judicious explorations; but we venture to assert that the exaggerated and preposterous mode adopted to bring them into prominence was illegitimate and opposed to the best interests of legitimate and practical mining. The result of all the unnecessary and inflated advertisements has been the creation of a distinctive and invincible notoriety for these adventures; but, putting the most charitable construction that we can upon these literary efforts, we will regard them as the offspring of either an incompetent or infatuated mind. In the letters which have recently appeared, and which are evidently the productions of the same prolific pen, we fancy we discover an attempt to supplement these writings. We presume they are intended to herald the existence of the Tamar Silver Extraction Company, and as such we would advise readers to ponder over them with caution. There is one peculiarity about this writer which deserves our highest admiration, and that is his occasional candour. He confesses that his opinion about the existence of gold in England is a mistake. We believe the advance of years will do much to mature his judgment, and temper the excesses of his flighty and volatile nature, and probably as he becomes less susceptible to the pressure of external circumstances he will make a similar confession respecting the abundance of silver. It is easy to write 100,000 tons, and as easy to express the number of ounces per ton; but are these assertions based upon rigid scrutiny and examination? Are they not of the same character as those which appeared respecting the enormous wealth of the once famous but now neglected and dead trio? We incline to the opinion that these values have no foundation in fact, and that they are statements of a financier who despises calculation, and who imagines figures with more facility than figures of speech. His prophetic musings we can dismiss as unworthy of consideration—they are very funny, but very foolish; but to give him a chance of retaining his prophetical reputation, we will assign to him the rank of prophet after the order of Baal.

But admitting all that he has said about the existence of silver as true—even admitting that his prophecies have force and are correct—there is a part of his letter which we must take exception to. When he alludes to the Tamar Mine (which, by the way, should be South Tamar), he says the cause of the accident was sheer carelessness. This is not true—the cause of that unfortunate accident is, strictly speaking, unknown. The origin of the disaster is attributed to the gradual disintegration of a loose slide, which extended through the mine, and was in communication with the bed of the Tamar. For months previous to the accident particles of this slide were found in the cistern at the 70 fm. level. How these particles got there was the subject of consideration, both by agents and men; but the destruction of the slide was not suspected. In the absence of other circumstances to account for the occurrence, it is probably supposed that the continual percolation of water through the slide, thus entirely destroying it, and thereby effecting a communication with the river, was the cause. Certain it is that the water did not break through by working too close to the bed of the river, for the most shallow level was 30 fathoms below that bed. We cannot entertain the idea that the most supine and inactive agent would daily go underground, and endanger his life, if he were conscious of such imminent danger existing. It was only on the Saturday previous to the Sunday when the flooding took place that the chief agent was underground inspecting the works. The 1000 people thrown out of employment by the catastrophe we need not notice, as it is in the usual figurative style of the writer, and we know how much it is worth for correctness. We would remind the writer of the proverb that those who live in glass houses should not throw stones.

Plymouth, Nov. 27. THOMAS WILLIAMS.

THE STANNARIES—THE COST-BOOK SYSTEM.

SIR,—In the Journal of Nov. 16 some questions were asked about the Stannary Court in Cornwall. The eyes of "Argus" cannot reach the transactions of some dealers in shares, although "Argus" professes to see through a brick wall. So can I, only knock a hole through it. The Cost-book System is perfection itself, if honestly dealt with; but when men deal in thousands of shares, transfer them to boys in their establishment, and female servants, with fictitious addresses, to avoid the calls, and innocent shareholders have been compelled to pay the whole amount of debts due to merchants, scores of families have thus been ruined and brought to beggary, whilst some dealers, to the knowledge of the writer, have purchased extensive freehold estates. Now, Sir, a little fishing bill in Chancery would disclose monstrous transactions, amounting to scores of thousands of pounds; and, as there is no bar to fraud in Equity, a rich field of mineral wealth is in embryo for any spirited solicitor who may lay the foundation of a splendid professional business, and receive the thanks of thousands of persons. The Cost-book System, so-called, of Cornwall and Devonshire has been disgraced by them practising such iniquity. The writer has been, as a purser, a sufferer to the extent of upwards of 200*l.* in one mine, as the books will prove by transactions of persons alluded to, and have met with such very individuals playing the game of "hide and seek."

No system is so inexpensive as the cost-book, which is really nothing more a secret than any respectable firm carrying on a merchantile business. The millions sterling realised by fair-dealing in Cornwall and Devonshire in working mines have been made just as a well-regulated firm make a fortune by their business.

There is no mystery about the so-called Cost-book System; it merely is a registry of all the working costs and charges of a mine, with the resolutions regularly entered at the meetings as they occur: and nothing is more simple, although a few years ago the greatest lawyers of the age wrote volumes about the Cost-book System; and when asked a few questions by any clerk in a mine the authors were dumbfounded, and more than once acknowledged they knew nothing about the system they had written about. This occurred a few years ago on the Western Circuit, a case having been removed from Bodmin to Bristol. The author of the book in question was engaged in the action, and came second-best off in the end, after fighting the battle some hours.—*Nov.* 26. A. BENNETT.

LEGITIMATE AND MARKET MINING.

SIR,—It may, perhaps, be invidious of me, as an outsider, to make any comment on the information contained in your Journal from time to time, but it has at times occurred to me, as a constant reader of your valuable paper, that too much is often made of several of the mining companies in your lists which scarcely deserve, in my opinion, the many lines constantly devoted to them and their prospective merits, while others that are most assuredly occasionally more worthy of notice are entirely left out in the cold. I allude, in the first instance, more especially to such mines as Treleigh Wood, Wheal Lucy, and their relatives—New Rosewarne, Wheal Grenville, and East Wheal Grenville—and a few others which are invariably "puffed" to any extent, and usually quoted at fabulous prices, far above their legitimate value, when one looks to the actual returns of these, I fear, delusive undertakings. In vain have I read and looked for some account of the vast quantities of tin to be sold from these wonderful "bals," and how often have I been disappointed only to find that this lode is worth (on paper) I don't know how much per fathom; that to be only a Doleoath or Cook's Kitchen in embryo; and last, but not least, the other to be lanes of tin, to be turned into gold "as soon as the stamps can be got to work."

How long it takes to purchase and erect stamps and set them to work I know not, but when that happy day arrives (ah, when!) I suppose we may expect to see tin pots and kettles at an awful discount. My other reference appliaes to such mines as Hingston Down, paying four-monthly dividends, with splendid prospects for the future; Wheal Russell, an excellent speculation; Furze Hill, an old but promising tin mine; Bedford United, a well-known mine, adjoining Devon Great Consols, gradually approaching its old position as a dividend-paying concern; South Ward, a young, well-managed, and progressive mine in the vicinity of the Old Tamar and South Tamar Mines, so well known to many as having paid tens of thousands of pounds to their fortunate shareholders, and in one of the finest lead districts in the two counties.

These, and many others I could mention, appear to me to be almost wholly neglected, except now and then your Mining Article condescends to favour them with a quotation. I have but little partiality for any particular property, but being a small investor in several, and taking some interest in the welfare of mining generally, I have selected the mines mentioned as showing the want of a fair criticism, founded on the merits of each respective undertaking. Knowing so well your impartiality and earnest desire to comply with the wishes of the community at large, I wish some more able pen than mine would devote now and again a few hours to a fair and dispassionate review of the legitimate and well-conducted concerns, of which there are many. The public would then be better able to judge for themselves as to their investments, and be somewhat more independent of certain brokers and their worthless recommendations. VIATOR.

London, Nov. 18.

CAMP FLOYD MINING COMPANY.

SIR,—I shall feel favoured if you will allow me space for a few remarks about Camp Floyd Mining Company. It was stated at the late meeting that the net profits on three months working placed the directors in a position to pay, if they thought fit, a dividend of 7*s.* 6*d.* per share—at the rate of 15 per cent. per annum on the original shares of 10*l.*, leaving 300*l.* balance to be carried forward; this was done in spite of many obstacles, one being that the expenses at first starting the company were greater than they are likely to be again. Doubtless, the fact of a large shareholder selling his shares has had much to do with the recent fall in their price. Still I would suggest to shareholders contemplating selling their shares to well consider what the mine has done, the very satisfactory explanations and grounds of hope given at the recent meeting, also the fact that by carrying out suggested improvements in working the ore, higher net profits than 15 per cent. (no mean rate of interest) may speedily be anticipated. I, for one, am more disposed to purchase more shares than to sell those I now hold. B. E.

Nov. 27.

CAMP FLOYD MINING COMPANY.

SIR,—Why do not the directors of this company declare a dividend, having stated they were in a position to do so at the recent meeting of shareholders? Unless they have some skeleton in the cupboard, which they wish to keep from the eyes of their constituents until, perchance, it suits their purpose, there is no reason why they should not at once declare a dividend—say, at the rate of 10 per cent. per annum on the three months ending October. The reticence of the board in this matter is doing much harm, not only by depressing the market value of the property, but by giving colour to the several sinister reports circulated by interested parties. Much mischief has already been done by the highly-coloured reports of the richness of the mines, and the great dividends they would yield; but there is no doubt that in Camp Floyd the shareholders have a good property; and with more machinery for a complete reduction of the ores a large quantity of silver can be returned, and good dividends declared. Until such time as a better method of pulverising the lode-stuff is hit upon a 10 per cent. dividend, paid *quarterly*, with a prospect of an increase when the returns warranted, would, I think, satisfy the shareholders, and render the property of more stable value in the market than it is at the present time. Should a dividend not be forthcoming very shortly, I should advise my fellow-shareholders to call a meeting, and request an explanation from our directors, and, if need be, make a change in the composition of the board, in accordance with the suggestion of "A. W." (in the *Mining Journal* of Nov. 16), which is not a bad one. At the meeting of the other day, which business elsewhere prevented me from attending, mention was only made of the Sparrow Hawk Mine in the published reports. Are we to assume from this that nothing is being done upon either the Marion or Last Chance? Perhaps someone in authority will explain.

A SHAREHOLDER.

[For remainder of Original Correspondence see to-day's Journal.]

COST-BOOK PARTNERSHIPS—THE ROYALTON MINING COMPANY.—In the Court of Queen's Bench a rule *nisi* was applied for, calling upon Messrs. Tweedy and Co., bankers, of Truro, to show cause why judgment, signed in their action against the company, should not be set aside for irregularity, on the ground that the defendants, being a company formed in Cornwall for working mines on the Cost-book System, could only be sued in the Stannaries Court. The Master had previously ordered the judgment to be set aside, and Mr. Justice Lush refused to interfere with that decision, hence the present application. The company, Mr. Arundel Rogers stated, had never been registered, being recognised, as all companies worked on the same principle were, as a species of common law partnership. He contended that the company, being such a partnership, could be sued in any court, and that the ground upon which the judgment had been set aside was, therefore, bad. Mr. Justice Blackburn remarked that it was quite a different thing to be sued in the name of a company. Mr. Roger submitted that a common law partnership was amenable to action in any court, notwithstanding the adoption and name of a company. Mr. Justice Blackburn was of opinion that no rule should be granted. The learned counsel was probably right in his first contention, that as the company was a partnership the judgment, when once the company began to be wound-up, must be attacked, not by the shareholders, but by their representative, the duly appointed liquidator. But he was certainly wrong on the second point—wrong in supposing, the liquidator having applied to set the judgment aside without previously obtaining the sanction of the Court, that the judge in chambers should refuse to do an act for the benefit of the company. Mr. Justice Mellor and Mr. Justice Archibald concurred, and the rule was refused.

FLOODING MINES.—The case of Fletcher *v.* Rylands clearly and finally settled the liability of persons who, for their own purposes, collect upon their land a body of water, which thence finds its way into and floods the land or mines of adjacent owners. The case of Smith *v.* Fletcher is explained by the *Solicitors' Journal* to extend that liability to persons who, by their operations, create in their lands hollows which (without their designing it) naturally collect water from the neighbourhood, and by ponding it up or giving it a new direction do like injury to neighbouring owners. The conclusion seems to follow irresistibly from the premises which justified the conclusion in Fletcher *v.* Rylands. The case that seemed in contradiction was Smith *v.* Kenrick, where the flooding happened in consequence of Kenrick having in the course of mining struck into hollows where the water was impounded, and the water came thence in its natural course into his own and thence into his neighbour's mines. He could scarcely be said to have brought the water; rather he could not keep it away.

FOREIGN MINING AND METALLURGY.

Business in copper has been quiet at Paris, and prices have been rather feeble. A fresh fall of 3*l.* per ton has occurred in Chilian bars and ingots, and also in English, while Corocoro minerals have fallen 2*l.* per ton. There has been little passing in Chilian at Havre in consequence of the extreme scarcity of the stock. There has been a fresh fall in copper at Marseilles. In Germany also copper displays considerable feebleness. Tin has been quiet at Rotterdam; some bankruptcies which have occurred at Amsterdam have occasioned a certain perturbation in the market. Banca has fallen to 89 fls., and Billiton to 85 fls.; a return to higher quotations is, however, anticipated. There has been great weakness in copper at Paris, and prices have fallen, Banca having receded to 164*l.*, Straits to 152*l.*, and English to 152*l.* per ton. A similar report may be made with regard to the Marseilles tin market. The feebleness of the English and Dutch markets has reacted upon those of Germany. At Hamburg and Stettin prices have experienced no change, but the demand has remained restricted. The Paris lead market has been very firm, prices have remained unchanged. At Marseilles lead has been quiet, with an inactive demand. The German lead markets have been generally firm; a fall of 8*s.* per ton has been noted in the prices of zinc of various marks delivered at Paris. Silesian zinc delivered at Havre has made 24*l.* 12*s.* per ton, and other good marks with similar delivery 24*l.* 8*s.* per ton. In Germany zinc has been very firmly maintained; at Cologne a slight advance has even been established.

The French iron trade is pretty well maintained, and this appears likely to be the case for some time to come. If a slight falling-off is remarked, as is usually the case at this period of the year, the circumstance has produced no effect on prices, as there are still a good number of orders on hand and in prospect. Quotations have scarcely varied; rolled iron has brought between 14*l.* and 14*l.* 8*s.* per ton, and charcoal-made between 15*l.* and 15*l.* 4*s.* per ton. The intelligence received from the Nord is encouraging; all the works are in full activity, and orders come to hand well. Official tables show that the imports of pig and scrap iron into France have slightly fallen off this year; the imports of iron and plates also declined from 53,000 tons in the first nine months of 1871, to 34,000 tons in the first nine months of 1872. The direct exports of iron from France increased from 43,250 tons in the first nine months of 1871 to 145,500 tons in the first nine months of 1872. The Franche-Comté Blast Furnaces, Forges, and Foundries Company will pay, on Monday, a dividend at the rate of 1*l.* per share, less taxes, for 1871-2.

The upward movement in iron is definitely stopped in Belgium; prices do not show any further advance, but, on the other hand, they do not fall much. There is a downward tendency observable in rates, but this tendency is slow in becoming general. Purchasers maintain an attitude of expectation, as they hope for more favourable conditions in the future, while sellers are also cautious, as they hope that the accumulated requirements of their customers may possibly involve a return to higher prices. The price of pig remains firm; plates have slightly fallen, in consequence of English competition, and merchants' iron seems likely to fall upon the first occasion. The adjudication of a contract for rails for the Belgian State system has been once more postponed, the preparation of the *cahier des charges* presenting probably some difficulties. The imports of iron of all kinds into Belgium in the first eight months of this year were 100,500 tons, against 56,000 tons in the corresponding period of 1871; the imports of August were 11,059 tons, as compared with 5367 tons in August, 1871. The exports of iron from Belgium have not increased in the same proportion; they amounted to August 31, this year, to 192,400 tons, against 165,396 tons in the corresponding period of 1871; the exports of August show, however, a slight diminution as compared with August, 1871, having been 25,000 tons, against 28,000 tons. To France and England the exports of iron from Belgium have risen this year from 8000 tons to 18,000 tons; and as regards the United States they have grown from 7000 tons to 16,000 tons; but in the case of the Zollverein they have declined from 70,000 tons to 52,000 tons. The statistics illustrating the Belgian export iron trade do not appear, upon the whole, to justify the feverish excitement which has characterised business this year. The Sclessin Blast-Furnaces, Ironworks, and Collieries Company will pay, on Monday, a second interim dividend for 1871-2 at the rate of 6*s.* 6*d.* per share.

There is nothing very novel to report in connection with the French coal trade. It may be observed, however, that there have been comparatively limited deliveries by water, while large deliveries have been effected by railway. The Northern of France Railway Company has done its utmost to provide for the extra traffic which has been thrown upon its system, but there have been great complaints as to the disorder which is alleged to have prevailed upon the Paris, Lyons, and Mediterranean system. In consequence of the want of combustible which has arisen in the South of France the management of the Tamaris Ironworks, near Alais, has been obliged to extinguish four blast furnaces. The operations of the foundry have also been greatly impeded. This interruption to industry occurs in presence of the regrettable fact that the Frélys Mines, which have large quantities of coal extracted, cannot effect deliveries in consequence of the great scarcity of trucks. Prices of coal continue very high in France, but it is probable that as soon as English coal begins to again make its appearance the reduction which has taken place in its value will also bring down quotations for French coal, at least in the Nord and the Pas-de-Calais. Comparatively limited supplies have been laid in, in consequence of the uncertain tendencies of the market. Purchases are only made to meet the current requirements of consumption, and very few contracts are concluded for next year. It is thought, and probably rightly, that prices can never be much higher than they now are, and that purchases will be made upon easier terms if an attitude of abstention is maintained for the present. Meanwhile, great attention is being directed to searches for fresh coal bearings, and to the best means of increasing the production in the Pas-de-Calais, the Seine-Inférieure, and the Beauvoisis. Some of these exploratory searches are stated to have been attended with profitable results, but only to a small extent. It is reported that great discoveries of coal have been made in the Feroe Isles, but that heavy expenses will have to be incurred before they can be rendered workable.

The Belgian coal trade remains in an inactive and hesitating condition. The extraction is increasing, but orders are well maintained, and this regular flow of orders induces apprehensions on the part of many industrials as regards their winter supplies. Upon the whole, however, a fall in prices seems probable, and such a fall would, it is scarcely necessary to observe, exert a favourable influence upon the Belgian industrial world generally. For the present there has been little change in quotations. Coke can scarcely be obtained at all, and it is rendered still scarcer by a deplorable invasion of the waters of the Meuse into the Grand Bac Colliery. Recent cold weather has stimulated the demand for domestic consumption, but a milder temperature having since been witnessed this demand will probably again experience a certain check. The exports of coal from Belgium have considerably increased this year, having amounted to Aug. 31 to 3,060,000 tons, as compared with 2,103,000 tons in the corresponding period of 1871, showing an increase of 50 per cent. in 1872. In August, however, the exports of coal from Belgium were only 401,000 tons, as compared with 412,000 tons in the corresponding period of 1871. The exports of Belgian coal to France in the first eight months of this year were 2,800,000 tons, as compared with 1,834,000 tons in the corresponding period of 1871. The exports to the Zollverein declined, however, to 51,000 tons, as compared with 36,000 tons in the corresponding period of 1871. The exports of Belgian coal to England in the first eight months of this year were of so little importance that they were not allotted a distinct heading in the Belgian official returns. The exports of coke from Belgium to Aug. 31, this year, were 510,000 tons, as compared with 296,000 tons in the corresponding period of 1871. France and the Zollverein contributed almost equally to the increase.

Meetings of Public Companies.

PANULCILLO COPPER COMPANY.

The ordinary general meeting of shareholders was held at the London Tavern, on Tuesday,—Mr. JOHN PENDER in the chair.

Mr. J. S. ALEXANDER (the secretary) read the notice convening the meeting.

The report of the directors (an extract from which appeared in last week's Journal) stated that during the year ending June 30 in Chili and September in England the profit realised was 5388*l*. The operations during the past year have been very materially restricted by short supplies of fuel and a scarcity of labour, while the price obtained during the year for the produce averaged something under 15s. 3d. per unit for regulus (equal to about 76*l*. per ton, less 2½ per cent., for bar copper) laid down in England. During the past year the quantity of regulus produced at Panulcillo was 5025 tons, a quantity which, taking into consideration the much smaller number of hands employed, compares favourably with the previous year, when the production was 7792 tons. The board have reason to believe that the mines are now being worked at a good profit, though this profit is naturally curtailed through the present enhanced price of fuel, carriage, labour, provisions, &c., and which necessarily augment the previous cost of production. Some of these adverse causes will, it may be hoped, shortly disappear, whilst the abolition in Chili of the import duty on coals now about to take effect should largely compensate for the present increased price of English fuel—though it will not affect the cost of coal produced in Chili itself. The board's attention is being directed to the propriety of rendering the profits now being made available for dividend, through the extinction of the balance still standing at the debit of profit and loss account.

The CHAIRMAN: Well, gentlemen, before moving the adoption of the report, I think it is right to make a few remarks on the different paragraphs of this report. This is, I think, about the sixth annual meeting that we have met together at which we have not been in a position to declare a dividend. I hope, however, that this is the last meeting we shall bring you together without doing so. Now, gentlemen, the last six years have been, I suppose, almost unprecedented in any trade for depression. We have seen copper go from 120*l*. per ton down to little over 60*l*., and in the last year—that is in the financial year—we have seen the price of copper fluctuate from 62*l*. to something like 110*l*. But copper has now settled down to a given price, which, if it continues, the prospects of our mine will be highly satisfactory. As you are well aware, gentlemen, we have had a great deal to contend with during the last year—you must bear in mind that I speak in respect to our last financial year. We have had in the first place the low price of copper, and, therefore, we have not had the full benefit of the rise which took place during the latter part of our financial year; then we had a large increase in wages, from something like 10 per cent. to 20 per cent.; and we have also had to contend against an advance in the price of fuel, at something like from 50 per cent to 150 per cent. We have also been subject to a short supply of Chilian coal, which we were always accustomed to receive. In short, through the high price and limited supply of fuel, our manager has been forced to largely reduce the production of the mine; the consequence of this is that what has been produced has been produced at a higher cost, and, therefore, yielding a smaller return than we might actually have expected from the high price of copper ruling during the latter part of our financial year. Still, according to the latest accounts received from our manager, our mine at the present moment is in a more satisfactory position than it has been at any former period since we commenced operations. The ley at the mine is considerably higher than at any previous time, and the mine is in thorough working order, a very considerable amount of money having been expended in putting it in that condition; and I may add that the amount has been taken from the income, and not from the capital. Consequently we are just in a position to take advantage of the tide of more favourable circumstances, which we believe is flowing in the right direction; at all events flowing in the direction of much higher prices than have ruled during the last six years. It will give satisfaction to you to learn that if the present prices of copper are maintained it is probable our future income will amount to something like 30,000*l*. a year. From the accounts we have received from our manager as to the operations of the last three months, or rather the first three months of our present year—that is, from June to September—we are informed that during that period we have earned about 7500*l*. Now, looking carefully into the costs, both as to the mining operations and the management of the company generally, and looking to the fact that coal is likely to be cheaper rather than dearer, we think there can be little doubt that that amount of earnings will be maintained, and probably exceeded, in future. With this prospect before us I think that we have no reason at all for despondency. No doubt there are gentlemen who have bought into this mine when copper was at a very high price, expecting that the mine would respond remuneratively to the high price paid for the produce; but now, owing to the circumstances I have named, that result not having been attained, have some ground for being disappointed. At the same time, however, no man who has bought into this mine, looking at it in the light of an investment, will, I believe, be disappointed with its future. Our prospect of 30,000*l*., which I have already stated, will be confirmed by some paragraphs, which I will read to you, from Mr. Weir's report, and which have satisfied us as to the probability of our present satisfactory returns being continued. It will be seen that some of the objects mooted in the paragraphs referred to is as to how we can bring that amount of earnings into dividends for our shareholders. Now, it will be necessary to remind you that before the railway was made we had not only difficulties to contend with from this source but others arising from bad management. The result was that there was a considerable loss—something like 60,000*l*.—accrued upon the working of the mine; in other words, the effect of this deficiency was to place our 4*l*. shares at a marketable value of something like 3*l*. If we were to take means to make our shares of the actual amount of 3*l*. by the extinction of the balance now standing at the debit of profit and loss account, we should be, as soon as that was effected, in a position to pay a dividend to our shareholders. Now, I believe, it matters very little what the cost of a share is so that you get a fair dividend upon it. That is, if you are receiving a certain amount a year—say, 30,000*l*.—and you divide it over either 150,000*l*. or 200,000*l*. of capital, you know what it comes to; therefore, I think it matters very little whether that amount of loss is wiped off, having regard to the fact that it is done with the view of placing the shareholders immediately in receipt of a dividend. I would only remark, in bringing this matter under your consideration, that I believe you will give me credit for speaking honestly on this point as in respect to all other matters connected with this property. I may say I am very largely interested in this mine; I have stood by it through all its difficulties, and I believe I may say for my co-directors, no less than for myself, that we have not changed our original holdings in the company since we became first connected with it. Personally, I hold 12,000 shares in the mines, and I am quite prepared to write off 1*l*. a share, so that we may begin to receive a dividend from the profit we are now undoubtedly earning. If this suggestion is not acted upon we must go on until we are in a position to wipe off this loss from the profits themselves, and only then can we begin to pay a dividend. I shall ask, before I sit down, the solicitor to state to you his views on the point, and that will come, perhaps, with more force from him, carrying with it legal authority, than in any way I can possibly put this important subject before you. Now, it is right that you should be informed that some of our vessels have been nine months on the way out to Valparaiso, and owing to these delays there was one month when our manager was actually short of fuel; but in the meantime, while waiting for this, and when, in consequence, certain operations were suspended, he was improving the mine in other directions. We learn by recent advices that this want of fuel is now remedied, and that he has had as many as 12 vessels at the port discharging coal for the mine, so that they all seem to have arrived at one time—that is a thing that no human power could control, and we can only hope that such a state of things may not occur again. In concluding a further paragraph which the Chairman then read, the manager said:—"We may safely say we consider the prospects of the mine (as to production and ley) fully 10 to 15 per cent. better than at the corresponding period of last year." The whole of our rolling-stock and machinery is in good working order, and will be kept so. Now, gentlemen, I would remind you that all this has been done out of revenue. Our position is simply this: we are now in receipt of something like 30,000*l*. a year, with the prospect of improving upon that amount if copper maintains its present value. Now, although there are some people who take a very sanguine view of the copper market, I cannot but hope, having regard to the true interests of the company, that the same speculative spirit which has characterised other markets may not again affect our produce, and that the price of copper may keep at a fair and legitimate amount through the legitimate sources of supply and demand. (Hear, hear.) We have been short of men; as soon, however, as the advance in copper values assumed the appearance of permanence our manager began to take on fresh hands; this is a slow process in a thinly populated country like Chili, but Panulcillo is a favourite mine among the native labouring classes, and you would observe by the report that, between February and June the staff had been strengthened by about 70 men. In July, trusting to the early arrival of fuel, our manager announced an increase of wages, ranging from 10 to 15 and even 20 per cent., and this brought in 60 more by the end of September. As he considered that the high price of provisions caused by want of rains, must stop all small mines and establishments, he expected a large addition after the national holidays of Sept. 18. If the manager was not disappointed in this our production of last month would show a large increase, for some of the belated ships must have turned up, and there were plenty of ores ready to operate on. The profit for the first three months of the current year (say, from July 1 to Sept. 30), has been carefully estimated by Mr. Weir at about 7500*l*. (or at the rate of about 30,000*l*. per annum), and as this was on a production still very restricted it will not be considered unsatisfactory in amount. As to the mine, I may say it has seldom looked better, or promised, better by all accounts. It is well handled by a man who knows his business well, and who has declared that he will push on full work when he gets the means by receipt of fuel. One extract you will be pleased to hear of what Mr. Weir wrote, when generally confirming the mining captains' report, on Aug. 31: "The two important points are the tunnel and Comunes' shaft; this latter still continues opening up favourably, both in depth and to the north; and although just at present the average of the ore from this part is rather under what it was, giving 6 to 6½ per cent., we have every reason to think this will improve again, as some soft ground we are in just now makes a large quantity of fine, and so reduces the ley. In *resume* we may say safely we consider the prospects of the mines fully 10 to 15 per cent. better than at corresponding period last year. The whole of our rolling stock and machinery is in good working order, and will continue to be kept so. We may also mention that we have now commodious offices and laboratories in lower works, also over 30 workmen's rooms completed, and good part of work securely enclosed, coal and ore yards enlarged, enclosed, and paved, and the work pretty well concentrated. Advantage was taken during stoppages to complete all this." And you will note, gentlemen, that all this has been done out of revenue. Before moving the adoption of our report I have, with reference to the 406 and 473 men mentioned in the third paragraph, to explain that these are in the mining department alone, and in addition to those employed at the furnaces. He then moved that the report and balance-sheet be received and adopted.

Mr. JOHNSTON seconded the proposition.

Mr. CLEMENTS (the solicitor), referring to the proposition for the reduction of the capital from 200,000*l*. to 150,000*l*., by writing off 1*l*. per share, explained that in the earlier history of the company about 50,000*l*. in round numbers of the capital was lost, and until that had been written off they could not legally declare dividends. He had suggested that it should be written off, by the shares being reduced from 4*l*. to 3*l*. each, by which plan they would be able to divide the profits by the payment of dividends.

Mr. GALSWORTHY asked how it was proposed to pay off the debts?—The SOLICITOR said it was not a question of paying off debts, but whether 50,000*l*. of the capital had been lost.

Mr. GALSWORTHY could not see that if by the reduction of capital they were able to pay a dividend why it could not be done now—nor could he understand to whom the amount of 50,000*l*. was due outside the shareholders.—The SOLICITOR said the question of what the company owe was not the difficulty in paying a dividend, but whether the company had assets to show for the capital obtained from the shareholders. Writing off the loss of capital had nothing whatever to do with the payment of debts—it was capital owed to the shareholders, and no dividend could be legally paid without showing upon the whole profit and loss account a balance on the right side.

Mr. GALSWORTHY said if the loss of capital had been occasioned by outlay upon the permanent improvement of the mine he apprehended the accounts should be so adjusted as to remove the legal difficulty.—The CHAIRMAN said they had from the beginning gone on improving the mine out of revenue, and he believed that at the present moment the mine was better worth 250,000*l*. than it was six years ago worth 200,000. He spoke as a large shareholder when he said that it really was a matter of no real importance to him whether the shares appeared in the books as 4*l*. or 3*l*. shares, so long as he was receiving dividends upon them.

Mr. W. C. QUILTER asked what salary Mr. Weir, the manager, received?—The CHAIRMAN said Mr. Weir originally received 1000*l*., but it had since been increased to 2000*l*. per year. Mr. Weir controlled the whole establishment.

Mr. Alderman WHETHAM said it struck him there had been a little haste in the recommendation for the reduction of the capital. Although the solicitor had told them there would be no difficulty in the way, his (Mr. Whetham's) experience told him the board would be overwhelmed by correspondence from the shareholders, asking for information. He could not exactly see how the principle applied that if the account this day showed a profit for the last year of 30,000*l*. why it could not be divided. He could enumerate 50 mining companies which had gone on for years losing money, but as soon as a profit was realised a dividend was paid.

Mr. CHERRINGTON said that, although it was a very unusual course to adopt, he did not upon consideration see any positive objection to it. He thought it a far better plan than if the shareholders had been called upon to pay the debts; and, as the directors had well considered the matter, the shareholders would do well to show their confidence in the board by approving it: and possibly it might have the advantage of improving the value of the shares in the market. He added that 63,000*l*. seemed to be a large amount due to creditors, and asked where the money came from to pay it?—The CHAIRMAN said from the results of the mines, adding of that amount the 35,000*l*. debenture debt formed the working capital. They had paid their debentures during the worst times.

A SHAREHOLDER asked upon what basis was it calculated that a profit of 30,000*l*. per annum would be realised?—The CHAIRMAN: Upon the present price of copper: 7500*l*. had been earned from June to September, upon a reduced production with a very high price of fuel and labour. It was true the price of copper had declined since then, but the directors considered the reduction in the price of fuel and the increased production would more than compensate for the difference in the price of copper. Consequently, they were assuming the current net earnings were the same as from June to September. They earned upon the year 5000*l*., and they had now earned for three months 7500*l*., so that there was now a credit of something like 12,000*l*. The Chili debt had been transferred here, hence they had increased the debentures, while the floating debt was less.

Mr. JAMES suggested that the accounts should be made up in such a way that a shareholder could see at a glance what assets there were, and what liabilities.

The CHAIRMAN said every shareholder was quite at liberty to go to the office, where the accountant would give every information; but if it were thought desirable the directors were quite prepared to separate the different items in future.

Mr. JOHNSTON said that the Panulcillo establishment account in the balance-sheet gave the 30,000*l*. which, with the debentures held, made the 63,000*l*.

The CHAIRMAN, in reply to a question from Mr. Quilter, stated that the impression of the directors was that with copper at 65*l*. per ton they should not lose money—that is, with coal and labour at a more reasonable price.

Mr. JAMES said the high price of coal did not rule till after the accounts had been made up.—The CHAIRMAN said they had had dear coal for some portion of the time embraced in the accounts.

Mr. WILLANS said he went to the office the other day, when their secretary gave him all possible information, and it was very undesirable to publish indiscriminately every item in a balance-sheet of a company like this. He hoped something would be done to get rid of these debentures—shareholders had surely better contribute 10s. per share, and pay them off.

The CHAIRMAN was exceedingly glad to hear that suggestion, because it so entirely accorded with the feelings of the directors. The Panulcillo and all copper mines had gone through a great deal of trouble from the depressed price of copper, and, as far as the Panulcillo was concerned, it would have been extinct had it not been the directors, who, before issuing the debentures, asked the shareholders to allow the directors to take them up, so as to keep the company going. The directors always had faith in it, and during the time when the shares were excited in the market, they had stuck to their holding, believing in the future of the mine; and he should be glad if they could to-morrow extinguish their debentures. He was not, however, so anxious about the debentures, because he knew the value of the property, as he was to see the shares reduced from 4*l*. to 3*l*., and at once pay dividends.

After some further discussion, the motion adopting the report and accounts was put and carried unanimously.

Upon the proposition of Mr. JOHNSTON, seconded by Mr. GALSWORTHY, it was unanimously resolved to re-elect Mr. Pender, M.P., a director of the company, at the same time thanking him for the clear and lucid explanations he had given of the position and prospects of the undertaking.

The CHAIRMAN, having thanked the meeting for this renewed mark of confidence, stated that this company had been with him a pet child, and one which had engendered a good deal of anxiety in its earlier days; but he really believed it had now entered upon a more satisfactory career, and the spirit shown to-day by the shareholders in co-operating with the directors could not fail to prove advantageous to the company. So long as he was connected with it—and he believed he should be as long as he lived, for he was a very large shareholder, and intended to continue so—it would be his pleasure and pride to promote its best interests. (Hear.)

Mr. QUILTER, as a Member of the Stock Exchange, suggested that his recommendation should be adopted in regard to the cancelment of the debentures—he was sure it was a most desirable thing to be done.

The auditors were re-elected.

A resolution was then passed to the effect that the meeting request the directors to take the necessary measures to enable them to apply the profits of the company's business to the early payment of dividends, and to the cancelment of the debentures.—The SOLICITOR explained that the above resolution was merely an expression of opinion, and that a subsequent meeting would have to be called in order to give it legal effect.

The CHAIRMAN said he was better pleased with the undertaking than at any period since his connection with it, simply because he found the shareholders were taking an interest in it, and going hand in hand with the directors to make it a good paying concern. (Hear, hear.)

Mr. BOND proposed that the best thanks of the shareholders be accorded to Mr. Weir for the satisfactory manner in which he had continued to conduct the company's affairs in Chili.—Mr. HARKER had much pleasure in seconding the proposition.—The CHAIRMAN, in putting it to the meeting, stated that the board had perfect confidence in Mr. Weir, who they believed was doing his utmost for the benefit of the shareholders.

A vote of thanks to the Chairman and directors was passed, when the proceedings terminated.

GREAT SNAEFELL MINING COMPANY.

The annual general meeting of shareholders was held at Douglas, on Saturday, Mr. H. B. NOBLE in the chair.

Mr. W. YOUNG (the secretary) read the notice convening the meeting, and the directors', auditors', and agents' reports, the statement of accounts showing a credit balance of 434*l*. 15s. 2d.

The directors reported that the quantity of lead and blende ores on hand will enable them to make an early sale. A contract had been entered into to extend the archway over the river, in order to increase the length of the washing-floors, which was much required.

Capt. H. JAMES reported that, on the whole, he did not hesitate to say that he considers their improvements in depth are such as to give the mine a more decided value at this moment than at any time heretofore, and that it will be his endeavour to develope these improvements as rapidly as possible. They have of dressed ores in stock about 20 tons of lead and 60 tons of blende, which he estimates to be worth about 500*l*.

The CHAIRMAN, in moving the adoption of the reports and accounts, said—The manager's report is so very clear and satisfactory that I need not add any lengthened remarks; but there are one or two features of importance that I must congratulate the shareholders upon. Many of you are aware that about the time this company was formed a discovery was made in the 40 fm. level north, which was continued without much change upwards, and is now in the 25 fathom level above, both in the roof and end going north, with whole ground to the day level, thus showing it was not stated for a purpose. Since then the levels below the 50 and 60 north have both produced lead ore, and show very favourable indications for early deposits; but the most encouraging feature is now in the 74, where there is a greatly changed stratum, mixed with good quartz, and the ground has become harder, and bears very much the same character as where the great deposits are made in the adjoining mine—Great Laxey. We may look with great hope to this level as deciding our future prosperity. The lode is from 8 to 9 ft. wide, and highly mineralised. Mr. Warington Smyth, the Government Inspector of Mines, expressed to me, after his inspection in September last, that the mine was managed to his satisfaction, and also his decided opinion of the importance of the change since his last visit. In the 74 north, the character of which was most promising for the future value of the mine, as also the fact of the lead still holding upwards from the 40 now reached the 25, and as good as ever. In that part there was sufficient ground, being whole to the day level, to make a mine. He also inspected, and fully approved of, the trial on the south mountain, or southern part of our sett, where open cuts have been made in order to discover the cross lodes, or slides, of the adjoining mine, and which pass through our sett, and, although the depth of the trial is only 12 to 24 ft., the rock contained mineral. Separate capital ought, in my opinion, to be raised, or a new company formed, to fully develope it properly, its extent being from the present workings quite sufficient for another mine, and it might not be advisable to take the present capital for that purpose. Some time ago one of your directors, a legal gentleman of extensive practice—Mr. Adams, I mean—determined to visit the mine, go underground, and see what he had for his money; and his interest in the mine may be judged by the fact that he owns one-eighth of it. He went underground, inspected every part of it, and on his return to the surface expressed himself as being fully satisfied with his investment. (Hear, hear.) Another shareholder, a medical gentleman, residing in Lichfield, a holder of 500 shares, has also inspected the mine, and wrote to me shortly afterwards stating that he was well pleased with the mine and with the civility and attention of our manager, who showed him everything he wished to see. In the directors' report reference is made to the extension of the arch over the river. This was recommended by your captain, and your directors considered this a favourable opportunity for having it done. A favourable contract was entered into for the construction of the work, and it will afford increased facilities for the dressing of the ores, facilities which were much needed. I do not think that it will be out of place for me now to say a word or two touching the balance-sheet. It will be perceived that the large amount on the debit side is principally for labour, and during the last two or three months that account has been increased in consequence of trials made on the south mountains. These trials have resulted favourably, and you will, I think, agree with me that it was judicious to make them. The expenditure under the head of merchants' bills has been principally for timber. Under the head of office expenses the expenditure has only been 79*l*. 5s. 4d., and that includes not only the secretary's salary, but also rent, postage, auditor, and the journeys to the mine, which have been numerous, and the distance is from seven to eight miles. On the other side you will perceive that the interest received from the bank will more than meet the whole of the office expenses, and interest on calls has also been paid by parties who have not paid in due time. So far as the balance-sheet is concerned, I do not think there is need for further comment on my part, but I may say I think it desirable that all the shareholders should make themselves as fully acquainted as they possibly can with the property. If any gentleman is desirous of inspecting the mine, it is my wish and that of the directors that every facility should be given for that purpose; and it is our wish also that every shareholder—no matter how small the interest that he may have in the undertaking—should have the fullest information. (Hear, hear.) Capt. James will at any time accompany any shareholder underground who may wish to inspect the mine, and the secretary will always be glad to give any shareholder the latest intelligence. (Hear, hear.) There shall be no secrets—no underhand work—in this mine if I can help it. The Chairman then read a letter which he had received from Capt. James that morning, and giving the latest information with respect to the mine, in which he said, "I have to-day been underground and put the men in the 74 end north to drive through the lode cross to the end, which is 3 fms. in advance of the last cross-cut. I am pleased to say the lode holds on its full size, with improved appearances of lead and blende. I also found the sump sinking from the 60 fm. level a little beyond this end to be much improved for lead and blende." The Chairman concluded by moving that the accounts and reports be adopted, and that the letter be printed and circulated amongst the shareholders.

Mr. BREW seconded the motion.

The CHAIRMAN: Now, the accounts are open for discussion, and Captain James will give you any information practically with regard to the mine, and I shall be glad to give you any information so far as the executive is concerned.

The CHAIRMAN said, in answer to Mr. Fisher, that there had not been a sale of ore yet. The directors were waiting until they had about 100 tons before they offered it for sale.

Capt. JAMES, in answer to a shareholder, said that they were not employing quite so many men now as the old company had engaged.

The motion was then put and carried unanimously.

Capt. JAMES said that yesterday he went underground at the mine, and at once put the men to work to drive through the level in the 74. In this the lode is very wide; indeed, too wide to carry the whole width, and it is looking very favourable and promising indeed, and up to that morning it was still improving. Both the sump and the lode had very much improved for ore, and were richer for lead and blende; the vein is regular, and there was every reason to expect that they would have a good lode in that level. If the 74 fm. level continued to improve as it had done they might soon look out for something very good in the mine. Having seen this improvement in the bottom level, he had considered it advisable that they should go down deeper, and then drive another level. The shaft is now down to 88 fms., and they had commenced to drive a level to the 85. On the whole, he considered that the mine was looking very promising—better than he had ever seen it, and he had such confidence in it that he would sooner venture 50*l*. now than 5*l*. at any previous time. He would strongly recommend that they apply all their forces to the bottom of the mine, for it was there they must look for ultimate success. He felt quite as much interest in the mine as any shareholder could possibly do, and his earnest desire was to prosecute its development and get it into a dividend-paying state as soon as possible.

The CHAIRMAN said that immediately on receiving Capt. James's report the directors were desirous of recommencing the putting down of the shaft. They were in a favourable position for doing this, having made an excellent purchase of pumps, &c., at a cost of, probably, not one-fourth of what would be paid for them now.

Capt. JAMES said that he could put the mine fully 20 fms. further down with the present pumps and appliances.

The meeting then proceeded to the appointment of directors, in the place of Messrs. Spittall and Berey, who were the retiring directors.

The CHAIRMAN said he had not said anything with regard to the payment of the directors. Personally he was determined not to accept any payment for his services as a director until the mine was in a dividend-paying state. When they received their dividend warrants then he would be happy to accept of their generosity, or to bow to any decision they came to in the matter. The Chairman then spoke in high terms of the manner in which Mr. Berey had attended to his duties as a director.

Mr. KILLEY said that he considered that the directors should be paid. He did not like the idea of anyone working for him for nothing.

Mr. BEREY, as a director, expressed his opinion that they should be content as directors to work without fee or reward until the mine was in a paying position.

Mr. BREW said they could not get better men for the position of directors than the gentlemen who were retiring, and, he, therefore, moved that Messrs. Spittall and Berey be re-elected.—Mr. P. KILLEY seconded the motion, which was carried unanimously.

Mr. J. D. Rodgers was then re-elected auditor; and, on the motion of Mr. Fisher, the directors were requested to have a list of shareholders in the company printed.

The proceedings then terminated with the usual vote of thanks.

NORTH ROSKEAR MINING COMPANY.

At length there appears to be something good in store for the adventurers of North Roskear. For ten years past we believe they have been doing little else but responding to heavy calls, that have been made to defray the costs of working, without the satisfaction of seeing any corresponding returns, and during all this time these calls have in the aggregate amounted to the enormous sum of 40,000*l*. But having faith in their property, the adventurers have, as a rule, regularly and promptly paid the demands that have thus been made upon them; and now it seems that they are about to be rewarded for all the anxiety and expense to which they have been so long put. When Capt. Josiah Thomas, than whom there is not a more practical or trustworthy miner to be found in the whole county of Cornwall, was appointed the managing agent of North Roskear, he expressed as his opinion that somewhere below the elvan course tin would be found in paying quantities; and the report which he presented to the adventurers at their four-monthly meeting, which we append, and which was received with considerable satisfaction, may be accepted as strong evidence of the correctness of Capt. Thomas's ideas. It is confidently expected that in the next four months the returns of tin will be double what they are at present, and the 2*l*. call recently made will be about the last. The meeting was presided

over by Mr. Thomas Pryor, the purser, who read the statement of accounts, from which it appeared that the labour cost was 2668*l.* 19*s.* 8*d.*; merchants' bills, 1477*l.*; discount for prompt payment of calls, 19*l.* 16*s.*; total, 4166*l.* 10*s.* 4*d.* The other side of the account showed that the sale of tin had realised 1765*l.* 3*s.* 8*d.*; arsenic sold and for sale, 103*l.* 11*s.* 8*d.*; copper ores sold, 26*l.* 15*s.* 6*d.*; sale of spare material by auction, 920*l.* 3*s.* 8*d.* The loss on the four months' working is about 1348*l.*, and besides this there was an adverse balance of 978*l.* from the previous account, making altogether a deficit of 2326*l.* Deducting from this sum 695*l.*, the amount of the last call, the actual present deficit is 1631*l.* 6*s.* 10*d.*

The following is the report of the agents, as read by Captain Josiah Thomas:—"Doctor's engine-shaft is sunk 4 fms. under the 265. The lode contains a little tin, and is rather improving in appearance. It is worth, for the length of the shaft (12 ft.), 15*l.* per fathom. In the 265, west of Doctor's shaft, the lode for the last 4 fms. driving has very much improved, having been worth, for a short distance, 100*l.* per fathom. This is apparently the top of a new bunch of tin, which has formed underneath the elvan course. The 265 west has now reached the elvan, which is dipping west, and the lode in the present end is worth about 40*l.* per fathom. The 265, east of the sump-winze, is within 2½ fms. of the 265, west of Doctor's shaft. The lode in the end is worth 15*l.* per fathom. We expect to hole this ground in less than a fortnight from this date, when we can shortly commence to stope the ends of the sump-winze from the 250 to the 265, and also sink another winze under the 265 in the rich lode which we have just driven through. We have commenced to sink a winze under the 250, about 20 fms. to the west of the sump-winze, where the lode is worth 20*l.* per fathom. The 250, west of Doctor's shaft, is producing a little tin. The 230, west of Doctor's shaft, is also producing a little tin, but is not of much value. The tin ground which we reported at the last meeting as having been found at the 150, east of Doctor's shaft, has since been set on tribute. Our returns of tin for the past four months have been diminished on account of the poor ground which we sunk through in connection with the elvan course. The returns for the next four months will, we think, be very materially increased, even without any further discovery, but we are looking forward with great interest to the sinking of the shaft in the hope of meeting with an improvement of the lode in depth.

In answer to a question from Mr. Tyacke, Capt. THOMAS said he believed that they would nearly double their returns by the time of the next meeting. At any rate, there was every prospect of their doing very much better than at present, but with their existing deficit he thought it right that a call should be made.

Mr. TYACKE moved, and Mr. WHEAR seconded, the making of a 2*l.* call.

An ADVENTURER asked whether with such prospects as they had before them a 20*s.* call would not answer the purpose?

The CHAIRMAN said it was true that very heavy calls had been made for a long time past, and, therefore, it was a matter for consideration whether a smaller call should not be made at this meeting. But he had consulted with one or two of the largest shareholders in the mine, and their idea was a 2*l.* call should be made. He hoped this would be the last call that would be made upon them.

Capt. THOMAS spoke most encouragingly of the present appearance and future prospects of the mine, and remarked that if they succeeded in getting a good bunch of tin at the shaft it would be a most important matter, not only for North Rosdear but for all the mines in the district.

The motion was carried, the accounts were passed, and this closed the business of the meeting.

The adventurers afterwards dined together, and here again Mr. Pryor, who presided, Mr. Tyacke, and the agents spoke hopefully and confidently of the future of the mine, and also of the excellent management of Captain Josiah Thomas.—*Western Daily Mercury.*

[For remainder of Meetings see to-day's Journal.]

MINING IN AUSTRALASIA—MONTHLY SUMMARY.

Adelaide, Oct. 8.—About 25 miles from Adelaide some extraordinary and continued discoveries of the precious metal have sent half the sober speculators in the city out of their senses. Since July 16 one lucky gentleman has obtained 920 ozs. of gold from his own land, and a company has now been started to work this valuable property. The total number of shares to be allotted, amounting to 15,000, were applied for by noon of the day on which the prospectus was issued. The news brought by the last mail of the further decrease of copper has had some effect in checking rash speculation in that metal. Several new companies have, however, been formed, and the money for that purpose, and for the subsequent purchase of the scrip has never been found wanting. The Moonta Mine has declared another dividend of 1*l.* per share, and as within the last six months it has produced 9605 tons of ore, containing 20 per cent. of fine copper, this is not to be wondered at.

Melbourne, Oct. 11.—Mining enterprise is steadying down. There are as yet few dividend-paying concerns, but the hope is great, the best paying mines being generally its measure. Transactions in gold shares have been less numerous, and limited almost to the Hill-end Companies. The rich claims of Beyers and Holterman's, Carrol and Beard's, Hixson's, Creighton and Beard's, Paxton's, Rapp's, and Krohman's, all continue to be favourite ones. Tin companies have experienced a decline, so many obstacles occur to bringing the mineral to market. About 220 tons have reached this port during the month, and much has been sold by auction at prices varying from 75*l.* to 84*l.* 10*s.* per ton. Since I last wrote, some beautiful diamonds have been found at Bathurst, and a deposit of opal of rare excellence has been found near Rockhampton.

A valuable discovery of silver has been made a few miles to the eastward of Kapunda. We have seen some specimens, which are in the possession of Mr. H. V. Moyle. One piece has the appearance of having been melted, and from some tests which have been applied it is said to be almost pure.

Some very fine specimens of iron ore have been received by Mr. A. L. MacDonald, of Geelong, from South Australia, and he intends to form a company to work it, there being an abundance on an 80 acre section, near which there is a good supply of wood and limestone. Some years ago samples were sent home, and after being tested by a person connected with the Lowmoor Ironworks, Yorkshire, he pronounced that the poorest specimens were richer than their best. The distance of the section from the place of shipment is only two miles along a good metalled road.

Mr. S. S. Vale, whose youth has been passed in this colony, and who employed his leisure when a commercial traveller in collecting minerals and studying them, has been rewarded for his efforts by being appointed Superintendent of the English and Australian Copper Smelting Works, at Newcastle.

The Bremer Mine is now clear of water. A large quantity of ore has been broken in the 50, 80, and 90 fm. levels, and the shaft being now ready for hauling stuff, it will shortly be at grass. A new boiler, weighing 8 or 9 tons, has arrived at Callington, and one of Capt. Hancock's patent jiggers is in course of construction. Several old workers returned recently, and the mine and town are looking something like what they formerly did.

At the Burra Mine operations are being prosecuted with increased vigour, and Kooringa appears again something like what it did in past days. Plenty of low-classed ore is obtainable, and the directors evidently intend raising and turning it into hard cash without unnecessary delay.

Capt. James, lately of the Blinman Mines, is taking charge of the Sliding Rock, and is being succeeded by Capt. Price, formerly of Talisker.

Captain Cowling, of the Yelta Mine, who so successfully managed the Wheal Hughes some two or three years ago, has been requested to again superintend operations at his old field of labour.—*South Australian Register.*

TIN.—Advices received from Australia state that there had been several important sales at auction of tin ore, the prices varying from 80*l.* to 84*l.* 5*s.* for 70 up to 76 per cent. assay, at Sydney during the month of October. The shipments from Queensland and the ore sold amounted to but 210 tons in all, 46 tons in excess of the previous month. This quantity is not sufficiently large to make home adventurers uneasy, but still it will be seen that the Australian supply is increasing.

AUSTRALIAN MINES.

YUDANAMUTANA (Copper).—From the superintendent (Adelaide, Oct. 7): In my last despatch I stated that I had engaged Captain Price to take charge of the mine and smelting works. He has commenced his duties, and under his management I confidently look forward to great improvements in the working and results from the mine. His report this month will give all the information that will be required as to the work done since my last. Mr. Fellowes (the purser) has resigned. I have appointed Mr. Shepherd (a resident at Blinman, and formerly engaged as book keeper for one of the storekeepers there), taking a fidelity guarantee for 500*l.* from an Adelaide office. I note by the report of the last annual meeting of the company, in the *Mining Journal*, that the directors intend appointing a manager to reside on the mine. I trust they have not carried this out, as it is quite unnecessary under the present arrangements I have made with Captain Price, who is competent to do all that is required, and if a resident manager is appointed I believe he will resign; there will be a great difficulty in getting another competent man. A manager (or captain) without colonial experience is not at all suitable for us. The statement of assets and liabilities shows a considerable deficiency upon the estimate of last month, and is accounted for by the fall in the price of copper, making a great difference in the estimated amount to receive for copper on hand.—Returns: The ore and slag smelted during the month, 270 tons; copper made, 23 tons 6 cwts. 3 qrs.; copper on hand, 6 tons.

PORT PHILLIP AND COLONIAL (Gold).—Clunes, Oct. 9: The quantity of quartz crushed during the month ending Sept. 10 was 4948 tons; pyrites treated, 19 tons; total gold obtained, 1080 ozs. 3 dwts., or an average per ton of 4 dwts. 8¾ grs. The receipts were 4161*l.* 9*s.* 8*d.*; payments, 3707*l.* 9*s.* 11*d.*; profit, 453*l.* 19*s.* 9*d.*, added to which was last month's balance of 260*l.* 17*s.* 9*d.*, making a total of 714*l.* 17*s.* 6*d.*, which was carried forward to next month's account. During the two weeks ending September 24, the quantity of quartz crushed was 2560 tons; pyrites treated, 8 tons; total gold obtained, 532 ozs. 10 dwts., or an average per ton of 4 dwts. 9½ grs.

ANGLO-AUSTRALIAN (Gold).—Capt. Raisbeck (Fryerstown, Oct. 10) reports: "On the 6th inst. got up steam, and commenced to pump from the east and west shaft, and the men commenced to work on the 9th inst.—to put in frame, set in plat, and secure the ground preparatory to sinking. The tributors have crushed, A. Waters and Co., 15 ozs., company received 60 per cent. J. Williams and Co., 1 oz. 9 dwts.; company received 40 per cent. C. Stocks and Co., 1 oz. 6 dwts.; company received 40 per cent. We are crushing for these parties and tributors. We will finish Williams's parcel from the west shaft this week." Mr. Kitto writes: "The Bank of Victoria having limited our overdrafts to 1500*l.*, and our present liabilities to that institution being 1340*l.*, Mr. Lamb and I have thought it advisable to push on the sinking of the east engine-shaft with the small amount available, and trust to the results of the various tributors to pay other expenses." The company remitted 1000*l.* out by the last mail.

YORKE PENINSULA.—The directors have received advices from the committee of inspection at Adelaide, dated Oct. 5 last, with reports from the Kurilla Mine to the 2d of that month. The following are extracts from Captain Anthony's reports:—"In handing you my monthly report to date I have again to express my regret that good miners, then hard to be got, cannot now be obtained at any price, except for tutwork bargains." * * * * "I offered four pitches on tribute, in which 16 men could earn excellent wages—indeed, my prices were intentionally liberal, to induce men to make a start here, but there was not a single bidder. Could these pitches be fully manned the yield of ore would pay the present cost of the mine. I set 2 fms. to drive (on tutwork) at the 25, west of Deeble's, as I am anxious to prove the lode beyond the cross branch, which yielded the rich ore at and south of the end of the drive." "The lode is 4 ft. wide, composed of quartz, felspar, iron pyrites, and yellow copper ore; it is a lode of great strength of character, and cannot but, if followed up by driving and sinking, become profitably productive. Two men go on to stope the ore in the 25, east of Hall's, until men of tributing spirit may turn up." The commitee report the sale of 64½ tons of ore, realising 364*l.* 3*s.* 8*d.*, and state that from 20 to 30 more would be ready to be sold in a few days.

ENGLISH AND AUSTRALIAN (Copper).—The directors have received advices from their manager, dated Port Adelaide, 8th Oct. last. At Port Adelaide there were six furnaces at work, two smelting, two roasting, and two refineries. About 155 tons of copper were ready for shipment. Confiderable supplies of ore had been sent to the New Lambton Smelting Works at Newcastle, and there were about 150 tons of fine copper there nearly ready for shipment.

AUSTRALIAN UNITED (Gold).—Mr. Lamb, Oct. 10: "An accident at the Central has interfered with the yield this month. After driving along the south-eastern boundary of the claim as far as practicable from present levels, blocking back had been commenced, when a great flood of water broke through the backs, and beat the pumps for several days; after which, while the ground was being secured, and the drives cleared up, the yields were necessarily small. Now, however, all is right again, and we have good reason to calculate upon very large returns before next mail, and for many months to come. A similar accident is not likely to occur again, as, the ground once tapped, the water is not likely to accumulate again. I have every confidence that the yields of the coming month will, at the very least, be double those of the past." Mr. Kitto also writes: "A fortnight since a very bad accident occurred at the mine. One of those bursts of water so often referred to by me rushed into the mine, and drove the workmen out, rising to a height of over 30 feet after filling the workings. The pumps had to be worked very rapidly, and tanks attached to the winding engine. All our efforts were, however, in vain for about three days, after which the water was gradually got under, but, I regret to say, only to leave the mine in a frightful state. The whole of the drives had to be cleared; the ground which had been crushed had to be secured, and we have been working almost without results for the past fortnight—only about 150*l.* of gold. I am happy to state that the mine is now clear, and likely to continue so, as the place from whence the water comes is kept open by my order; so that, instead of coninuing it, we hope in future to draw it regularly away. This morning's letter from Captain Angove gives me the satisfactory intelligence of his opening four drives, and of good returns resulting once more. I have not yet concluded arrangements with the owner of the property to the north and west of the Central Mine, but hope to do so shortly. He is holding out for a royalty of 8 per cent. on the gross yield of gold, and 100*l.* cash deposit. I offer 6 per cent. on the gross yield, and no deposit. I will advise you as the negociations proceed."

SCOTTISH AUSTRALIAN.—The directors have received advices from Sydney, dated Oct. 7, with reports from the Lambton Colliery to the same date. The sales of coal for the month of September amounted to 12,753 tons.

FOREIGN MINES.

ARUBA ISLAND (Gold).—At the offices of the company can be seen the exact model of a nugget of gold which is now on exhibition at the Museum of Leyden, Holland, weighing 6·415 kilogrammes, equal to 17·188 lbs., and which was discovered in the Island of Aruba; the model was executed under the supervision of the director of the Museum, and the following official letter from the Minister of the Colonies at the Hague has been received relative to it:—"The Hague, Nov 25: Sir,—In the name of the Minister, I have the honour, in reply to your letter of the 16th of this month, to inform you that in 1825 there were brought hither five cases with gold from Aruba, containing 71,132 kilogrammes net, and consisting of sundry pieces, as well large as small. According to the result of a very minute chemical examination, made at that time by Prof. C. G. C. Reinwardt, the contents of one of these pieces amounted to 892·1000 fine, equivalent to carats 21·46 qr., and the residue or alloy of that native gold was for the most part pure silver. Some of the pieces in question, amongst them one of the weight of 6415 kilogrammes, were, at the expense of King William I., placed in the Museum of Natural History at Leyden. According to 'Remarks touching the Nature of the Soil of the Island of Aruba, and of the Gold there Found,' by the aforesaid professor, published in 1827, in the first volumeof the new treatise of the first closs of the heretofore Royal Institute, the first gold discovered on Aruba was in 1824.—HENNEY, the Secretary General to the Ministry of Colonies."

DON PEDRO NORTH DEL REY (Gold).—Telegram from Lisbon: "Produce weighed to Oct. 30, 2098 oits. Estimate for October, 3226 oits."

SAN PEDRO.—R. M. Kitto, Oct. 15: New shaft has been sunk about 18½ metres below the 135; sinking by eight men, at 840 per metre. I have made a contract with this pare of men to sink the shaft 36 metres, and drive 6 metres each side of the shaft; if completed by the end of January next to give the men a premium; the appearance of the ground at the shaft is everything that can be desired for producing copper ore. We have cut the lode, or manto, in the crosscut in the 135 west, and are now driving north; this part of the manto is 4 ft. wide, and will produce 2 tons of 30 per cent. ore per fathom; it is looking very kindly for further improvement. The stope in back of the 135 is communicated with the 128; we have been engaged since my last in filling up with poor stuff and securing the same. A stope on the south part of manto, in back of the 105, will produce 15 tons of 30 per cent. ore per fathom; this has improved since my last. The chiffon sinking in bottom of the 128 is communicated with the 135. In the 128, driving west, the manto has changed its course, and is making a circle; it will now produce 4 tons of 20 per cent. ore per fathom. A stope in the back of this level will produce 6 tons of 20 per cent. ore per fathom; this is on the change from black and grey ore to yellow bronces. The north part of the manto, in the 122, driving now nearly south, will produce 2 tons of 40 per cent. ore per fathom; this is producing native copper. A new end in the 122, driving west to cut the western branches, is producing good stones of ore.

A new end in the 110, driving west to cut the western branches in this level, has also a kindly appearance. The 88, driving west to cut the western branches, is in a beautiful stratum, and is sure to be productive. The tribute pitch in the back of the 110 is suspended on account of not having dressing-floors, room sufficient to dress the ores, and make so many piles. The new end in the 30 is driving on a branch 1 ft. wide, and will produce 1 ton of 30 per cent. ore per fathom. We are busily engaged in taking out foundations for boilers and engine house, as well as making new dressing-floors. We have about 4000 quintals of dressed ore on the mine. Our monthly raising is about 3000 quintals of about 28 per cent. ore, and as soon as the machinery is erected I think we can double that quantity. I do not hesitate to say we have the best mine in Chili.—Santa Helena Mine: A chiffon sinking on the course of the manto is producing stones of ore; the ground is very troublesome for working, being full of vughs or openings in the lode, and we are making very slow progress here.—San Antonio Mine; A new shaft is sinking from surface, by three men; ground favourable for sinking. In conclusion, I beg to state that the San Pedro Mine is looking splendid, and everything is in very good working order.

FRONTINO AND BOLIVIA.—The directors of this company have received their usual advices from the mines, accompanied by a remittance of 301¾ ozs. of gold-dust, valued at 700*l.* 15*s.* 2*d.*, produce for September last.

EMMA.—Telegram from Salt Lake City, Nov. 26: "Forwarded no ore this week to New York; raised 390 tons first-class ore this week; raised no second-class ores this week; 360 tons first-class ore at the railway depôt; 380 tons first-class raised ore at mine; 220 tons sold here; first lot from bottom of the mine sampled $220 and 50 per cent. lead." Note.—$220 (111*l.* 5*s.*); 50 per cent. lead gives 6*l.*—47*l.* 5*s.* per ton.

BIRDSEYE CREEK (Gold).—G. S. Powers, Nov. 4: At the present speed of working it will take about seven months to finish the tunnel. To-day I shall send you statement of current expenses for October, as per cost-sheet. I have not washed in Uncle Sam claim since October 12, but I have plenty of work yet for two weeks on different claims. You will notice receipt for special school-tax for $19 80-100ths. The company's property was assessed at 857,500 at $166-100ths, making $920, which will have to be paid the 20th inst. We are having a fine rain to-day, the first of any amount this season, and I should be glad to have it continue until we can get a supply for ditch.

LAST CHANCE.—Mr. G. C. Frames, the director who has just returned from the mine, states that his arrival in Salt Lake City was greeted with the announcement that the expected intersection of the tunnel with the lode had taken place a day or two previously. The mine is situated in the Oquirrh mountains, 3 miles beyond Bingham City, and 28 miles south-west from Salt Lake City, whence there is good road the whole distance; the last 3 miles a heavy ascent, of which a mile or so leading to the mine has been made by the company. The tunnel had been driven 310 feet to cut the lode, which was about 3 feet wide, as far as exposed, by the extention of the tunnel west for 14 feet. The work on the course of the lode east was producing a fine milling ore, estimated at 15 cubic feet to the ton, and value about $90 in gold and silver. To quote the superintendent's (Mr. Maxwell) words, it was "the prettiest lode he had seen in the country;" it began at a dip of 55° to 40°, and was then at tunnel about 20°, a favourable feature in granite lodes. The walls are tolerably parallel and well defined. The shaft was expected to communicate with the tunnel in about 20 feet. There were 10 to 12 tons ore on the dump at the tunnel mouth, and about 40 tons at the top of the shaft, value all round (say) $70 per ton; more precise estimates of cost and value must be deferred until actual sales or reductions have taken place. There were 20 men employed under the superintendence of Captain Cullens, who appears to be a capable and striving officer. There are no mills in the neighbourhood for the reduction of the ore, and a five-stamp mill would cost, erected, about 3000*l.* Before incurring this outlay, Mr. Maxwell resolved on a trial in an amalgamating pan at a trifling cost. Since his return one has been made for the company in San Francisco, and the result of the experiment may now be daily expected. Meantime, during his stay, a negociation was opened with an adjoining mine, whose ores were poor in silver, for the sale of Last Chance ore to melt in combination. Price to be settled on the result of a sample of 10 tons. A few days more, as in the other case, should inform the board whether the ore can in this way be turned to good account during the time that the mode of reduction is in suspense. He was pleased to learn the very confident opinion of their officers that no interruption to work or transport need be feared in the winter season. There is always running water for a stamp-mill, and ore can be carried over the snow on raw hides. Mr. Maxwell and Captain Cullens both expressed their strong belief that the mine would be able to pay dividends within three months from the date of his visit—that is, about the end of the year. Branch lines will shortly connect the most important canons with the Utah Railroad—that to Bingham Canon is begun—and is a recognition of the variety and importance of the mines in that locality.

RICHMOND CONSOLIDATED MINES.—*Telegram:* "360 tons, produce $19,000."

NEW ROSARIO.—Mr. M. V. Cumins (Nov. 14) reports that Rosario, in the opinion of many, will even surpass the Real del Monte property. In the Rosario lode the quemazon is continuing north and south. The assays of Mr. Felipé Neri de Parres, of Mineral del Monte, gives the values as—No. 1 south, 26*l.* 8*s.*; No. 2 south, 32*l.*; No. 1 north, 33*l.* 12*s.*; and No. 2 north, 48*l.* per monton of 3000 lbs. Such results, he considers, show that they must be on the top of a fine shoot of ore. San Francisco had been stopped, but the lode had much improved. At the Incarnacion shaft there was also a great improvement. One of the Real del Monte mines is at present returning 280,000*l.* a-year in dividends to its shareholders, and their ore averages only 14 marks (22*l.* 8*s.*) per monton. The report is altogether very encouraging.

EXCHEQUER (Gold and Silver).—Oct. 28: Thirteen feet were run towards the Acacia last week, and two sets of timbers put in. The footwall is pitching about 45°, and the hanging-wall almost perpendicular. You will be glad to hear that the frame of the hoisting-works for the new shaft is all but completed here, and part of it hauled to its place. The work at the mill outside is finished, and storms cannot affect the work now to be done—fitting up the pan and agitator floors and frames, and placing the machinery, which is all housed.

HUDSON (Gold).—S. O. Brown, Oct. 19: I estimate that an average depth of 2 ft. per day will be attained, and the price to be $15 per foot for underground work, including the setting of timbers and the cost of powder and fuse. For underground labour per day, $30; for top labour per day, $16; for timber and other supplies, $5; for salary and other expenses, $10=$61, being equal to $1586 per month. This may be putting the amount a little too high; but, taking the expenses of the Gwin and other adjoining mines as data, I think not.

— Oct. 26: I am more than pleased with the result of the work done on the Spur, about which I wrote you as having located. I had an old shaft, 30 ft. deep, cleaned out, and found that the early prospectors had stuck on to the ledge in perpendicular sinking; I started down from the bottom on an incline following the ledge, am down with the new work 10 ft., and find the ledge 3 ft. wide, and producing the finest-looking rock I have seen in the vicinity. I think by running a drift towards the point of intersection with the main lead we shall be enabled to gain some valuable information respecting the probable whereabouts of a chimney of rich ore. The rock taken from the present shaft can be easily conveyed to the mill, and will certainly pay a handsome profit. I gave you the result of several assays from the old dump, in No. 9 letter, and this now being extracted looks much better; will send an average sample to San Francisco for assay when I forward that from the bottom of the main shaft.

MALPASO GOLD WASHING.—R. C. Clarke, Oct. 18: We cleared up on Sept. 14. On account of work that had to be done on the ditch, and putting in new sluice, we did not get to washing again until the 23d, since when we have washed 194 hours, a portion of the time with a very light head of water. We have gone ahead since we began over 300 ft., and now have a face about 200 feet wide, with banks from 15 ft. up to 50 ft. high. We have put down since we began to wash 200 ft. of sluic. Now that I have the mine open, and the surface cleared, I find that the old Spanish workings are much deeper and more thorough than anyone ever supposed. I also find the amount of waste is much greater than I anticipated. So far as I can tell by appearance of gravel now exposed we are to the east of the lead, and are now working towards the west, to see if I am right. The gravel has improved in the banks, and I have a layer at bottom that prospects rich; it is not over 3 ft. thick yet, and so low that we cannot get at it with the pipe, but we wash down to top of sluice, and I now have peons picking and shovelling in the balance. I am in hopes as we advance to be able to get under this rich layer with the sluice. After I make another clean-up I may be able to form some estimate of what may be expected from the mine, but at present it is impossible. We have been at work continually on the ditch, and increased its capacity about one-third. We have had considerable rains lately, which gave us all the water our ditch would carry. The gold we took out is lying here in amalgam; I will retort and melt it with next clean-up.

The following extract is from the general agent's letter, under date Oct. 19:—"I have just been down and had a look at the bank. We have come upon a poor bed of gravel between the rich stuff, and then the waste from the Spaniards is more than we calculated upon, however, we have very rich gravel at bottom. The channel, or lead, of rich ground appears to be on one side of us, and we shall have to work towards it. Clarke got about 2 lbs. of gold, very fine, and all in the upper part of the flume, so you see we catch all the gold. We could not see where the rich lead was until we had opened out a piece, and my opinion of Malpaso is just as good as ever."

RICA GOLD WASHING.—C. R. Clarke, Oct. 18: We have our workshop finished, have 65 peons at work, and are pushing ahead as fast as possible. We have over 2000 ft. of lumber being delivered as fast as cut. The stores are nearly all on the mine, and in a few days I shall start to work on the pipe. Mr. Adams informs me they have now finished over two miles of ditch, and are getting along rapidly.

MONTE ALBO.—Wm. Martin, Nov. 15: Su Ergiolu: In the No. 6 level, driving south of new shaft, the lode is 60 centimetres wide, and will yield ½ ton of ore per metre. We have suspended this level for a few days to enlarge plat, which we expect will be finished by the 19th, when the driving will be resumed. In the No. 5 level south the lode is at present poor. In the No. 4 level south the lode is also poor at present; by the nature of the ground here we have about 4 metres more to drive to get under the winze which was sunk by the former owners of the mines.—Stopes: No. 1, in back of No. 5 level, south of new shaft, will yield ½ ton of ore per metre: No. 2 will yield ¾ ton: and No. 3, ½ ton per metre. No. 1 stope, north of new shaft, in back of No. 5 level, will yield ½ ton per metre. The rise in back of No. 5 level, north of new shaft, to communicate with No. 4 level, is at present poor: this rise is being communicated to throw down stuff from the No. 4 level to fill the stopes.—Napoleon: In the winze sinking in bottom of this level the lode is 1 metre wide, composed of schist, white iron, and producing good stones of copper ore: this winze is being sunk to prove the ore-bearing ground which we had in the back of this level.—Campaign: Stopes: No 1, in back of Galleria Nuovo, will yield ½ ton of ore per metre. No. 2, in the back of this level, will yield for lead ore ¼ ton per metre, and is also producing some good stones of copper ore.

UNITED MEXICAN.—Edward Hay, Oct. 23: A slight improvement is reported in the ley of the ore obtained from the middls works of the mine of Jesus Maria. Hopes are entertained that the accounts may for that reason be less unfavourable than they have been for some time past. The extraction of ore from the mine of Remedios continues to decrease.—New Concern: In the end west of the adit of San Cayetano a well-defined wall, running about north 70° west has been traversed obliquely, and inside a promising looking lode has appeared in spar and quartz matrix, with pyrites, containing traces of gold and silver. In the cross-cut of La Verdad, at 12 metres from the adit, the same vein as has been found in the end west was traversed. It is 3 metres broad, in quartz and carbonate of lime. After passing this lode the rock (greenstone) has a great quantity of pyrites mixed with it, and the surveyor is of opinion that another branch of the lode must exist to the south. In San Edwardo cross-cut there is nothing new to report. In San Fernando cross cut on the mine of San Antonio de la Ovejera, work has been resumed without any change in the rock up to the latest dates.

BENSBERG.—J. W. Hoffmann, Nov. 23: In the open cast we are still busy clearing fresh grownd, at the same time getting some carbonate, which appears in nests and thin beds in the top stuff. The wash ore, which we get from the deeper parts, is very productive, and contains a great deal of round ore. We cannot yet commence getting carbonate from the rich bed at the west end, there being about 12 ft. of sand to take off before we reach it, and which we cannot do until our washing apparatus is moved from its present position. We shall do this as soon as the frost is so strong as to prevent washing in the open air. The roof of the dressing-floors is making great progress; the beams and rafters are up, and the boards will be fixed next week, after which we shall proceed with covering it with roofing felt. Neither of the shafts were sunk this week. In the main shaft, which we have christened Victoria shaft, by which name I shall henceforth term it, we got all the fixings required for lowering the pump ready, and shall do so as soon as we can find a suitable windlass. I have several on offer, and shall choose one of them, if I can agree about the price. Week's production of saleable ore, 20 tons; average assay, 40 per cent.; week's production of galena, 5 tons; average assay, 10 per cent.; week's production of wash ore, 25 tons; average assay, 13 per cent.; stock of ore ready for market, 40 tons.

LUSITANIAN.—Thomas Chegwin, Nov. 19: Palhal: The lode in Taylor's engine-shaft, sinking below the 160 fm. level, has not been taken down, and must, therefore, be assumed to be as last reported—say, 5 tons of ore per fathom. —Levels on Basto's Lode: In the 140, east of Taylor's, the lode is from 3 to 4 feet wide, composed of quartz. In the 160 west the lode is 5 feet wide, containing a branch of ore worth 2½ tons per fathom. The lode in the eastern end of the 150 is 4 feet wide, composed of quartz and stones of ore; in the western end it is 5 feet wide, worth 2½ tons per fathom. In the 140, east of Taylor's, the lode is 5 feet wide; and in the 130, east of River shaft, 4 feet wide, composed entirely of quartz. In the 120, east of River shaft, the lode is 5 feet wide, and made up of loose quartz and spots of lead. The lode is of no value at present in the 110, east of River shaft; but in the 90 east it is 1½ foot wide, yielding stones of ore. The lode in the 80 fm. level, east of winze No. 89, is 4 feet wide, composed of schist and quartz, spotted with lead. The 70 is going east of River shaft, on a lode 1½ foot wide, composed of black flookan mixed with mundic, and yielding stones of ore. In the 38 fm. level, west of the slide, the branch is 6 inches wide, spotted with ore and mundic.—Mill Lode: In the 18 fm. level, east of Taylor's, the lode is 9 inches wide, worth ½ ton of ore per fathom.—Slide Lode:—In the 140, south-west of Taylor's, the lode is 1 foot wide, composed of flookan and quartz; and in the ends of the 130 fm. level the lode is 1 to 1½ foot wide, of flookan and schist.—Cross-Cut: The ground in the adit cross-cut, south of branch, west of Perez' shaft, has been a little easier, but is now hardening again. Winze No. 92 is being sunk below the 70, east of River shaft, on Basto's lode, which is 5 feet wide, spotted with lead and mundic.—Carvalhal: Cross-Cuts: The 60, north of Incline shaft, is in a dry gneiss; in the 60 south the ground is wet, and contains a branch of quartz 3 inches wide, giving out a good stream of water.—Great Lode: The 60, east of Incline shaft, is being extended on a lode 3 feet wide, composed of quartz and spots of lead; and the 50 east on lode 1 foot wide, composed of quartz, schist, and mundic. The lode on the 50 west is 1½ foot wide, spotted with lead. In the 40 east and west the lode is composed of quartz and mundic. In the 30 east the lode is 1 foot wide, of no value, and in the 20 east it is split up into small branches of quartz.—Caunter Lode: The 10 yields stones of lead, and in the 20 west the lode contains a little lead and mundic. The flookan lode in the adit west of incline shaft is 1¼ feet wide, composed of flookan and schist. A rise going up in the back of the 50, east of incline shaft, on great lode yields stones of ore.

WEST CANADA.—Nov. 8: Wellington Mine: The stope under the 40, east of Rowe's shaft, will yield 2¾ tons of copper ore per fm.—Huron Copper Bay: The stope in the back of the 60, east of Bray's shaft, will yield 2½ tons per fm. In the west of Palmer's shaft we have one stope in the bottom of the 50, yielding 2½ tons, and one in the bottom of the 35, yielding 3½ tons per fm. There are two stopes in the bottom of the 35, east of Bray's shaft, yielding 2½ and 3 tons of ore per fm. respectively, and one in the bottom of the same level, west of Bray's, yielding 2 tons per fm. In Bray's shaft the lode has become less productive in the last 6 feet sunk, and is now worth about 1 ton per fm. In Bartle's winze under the 60, east of Bray's, the lode is large and promising, and will yield 2 tons per fm. The stope in the bottom of the 20, east of new engine-shaft, is nearly exhausted.

[For remainder of Foreign Mines see to-day's Journal.]

FRONTINO AND BOLIVIA.—In explanation of the discussion which took place at the meeting on Nov. 22 (the details of which appeared in the Journal), relative to the position of the holder of a debenture of this company, by reason of Messrs. Restrepo, the company's bankers at Medellin, having a first charge on the company's mines, the directors have issued a statement to the effect that Messrs. Restrepo's mortgage extends over a part only of the Bolivia property, and was originally for about 4500*l.*; and, through the kindness of Messrs. Restrepo, it was arranged that the mortgage money and interest should be repaid out of the profits of the mines, by which means the mortgage has already been reduced to about 2500*l.* The debenture holders have, therefore, a first charge on the Frontino Mine, and on a portion of the Bolivia Mines, and a charge on the remaining part of the Bolivia property, subject only to the mortgage to Messrs. Restrepo. In the event of the debenture holders' money or interest not being paid, according to the terms of their debenture bonds, the debenture holders will be entitled either to sell the property or to foreclose their mortgage, and take the property for themselves.

LUBRICATING COMPOUND.—The invention of Mr. B. FRENCH, of Rochester, New York, consists in the combination of beeswax with petroleum or other oils, and plumbago, for holding the plumbago in permanent suspension: also in the combination with the beeswax, oil, and plumbago, of alkali and tallow (or their equivalent, soap), for saponifying and solidifying the mass.

Royal School of Mines, Jermyn Street.

[FROM NOTES BY OUR OWN REPORTER.]

LECTURE LX.—Mr. WARINGTON SMYTH, in his concluding lecture, spoke as follows:—We come lastly to consider what is to be done with all this material when it is ground, and crushed, and triturated to these various degress of fineness. Of course, the primary object to be obtained is to separate the useful and valuable portions from those which are worthless. The principal agent in this work is the action of streams of water, by which the different specific gravities of different metals and materials are turned to account. The impetus given to the moving material by this means varies according to the inclination down which the fluid passes, the amount of water, and the area over which it flows. It is obvious if the inclination be the same the water will have a stronger effect in a narrow than in a broad stream. Then the gravitation of each particle; the friction against the bottom and the sides to be overcome; and, lastly, cohesion amongst the particles themselves, must all be taken into account. The last is an important condition in all cases where the material is pounded into a slime of various degress of tenacity. All these apparatus consist more or less of inclined planes, but there are a vast variety of them. If we look back for centuries we shall find by the old work of Agricola, to which I have so frequently alluded, a great many plans were in use in his day which do not materially differ from the Cornish tin stream-tye system—in fact, they are exactly the same in principle. The terms "buddle" (German, "heerd") and "frame" are applied to a great variety of apparatus. When the material first comes from the stamps kofer—or as it is often called the stamps pit—it is passed over a "griddle," by which a sort of division takes place. This is so rough and insufficient that it cannot be depended upon, and so large troughs of wood, called "tyes," are employed, which vary in length, but are usually from 9 ft. to 15 ft. long, from each of which the material passes to the next, the streams of water leaving the heavier pieces or particles in the earliest, and leaving some in each till the water flows out at last comparatively clear. Sometimes they have a box, called a "saver," after the tyes, which are usually three in number, or a slime pit as the fourth, in which "saver" the water ought to be left long enough to allow all the valuable material remaining to be deposited also in a kind of slime at the bottom. In this partitions of board are put, so that the water is made to travel a considerable distance at a sluggish speed. In spite, however, of all these precautions there is a loss of a considerable percentage. If the material be composed of parts which have different specific gravities, and is set moving by means of water, the separation of one from the other is easily made, but in order that this may be effected the mass must not be of all sizes—that is to say, of small lumps and large—and, therefore, something must be done to secure this important preliminary. This renders the work involved and expensive. To meet this difficulty the Germans make the first tye rather narrower than the second, and the third still wider than the second, so that the current is made in each to spread over a wider area than in that preceding, and the heavier class of grains will have a tendency to deposit. This is not sufficient to size the material, and it is, therefore, made to pass over a griddle, to which a shaking motion is given, like that by which a common sieve is used. These griddles have come more into play of late than formerly, and exhibit in their varieties much ingenuity of action.

M. Rittenger, a few years ago, invented another apparatus, called the "spitschrusten," a contrivance of great ingenuity and value, but which has not yet been tried in our own tin mines. By this the floor of each inclined plane or trough is divided into a number of V-shaped hollows, each of which will retain some of the rougher stuff, while the remainder goes on to the next, and so on. These hollows, however, have a tendency to draw out the fine material as well as the rough, particularly when the specific gravity of the former is considerable in comparison—a disadvantage which, it is said, the inventor has contrived to overcome. No doubt there is a better assortment in the first instance than by some of the older plans, and the action is more continuous. In Germany the buddles are made so as to receive a considerable amount of material. They are then called "kehr-herd," and the word "herd" has been imported into the French mining districts; and, in fact, a great many different terms are applied to suit almost every kind of inclined plane. The buddle of the old style was called a "nicking buddle," and was a pit dug in the ground, and lined with stone, but now more commonly built of wood. At first there is a head board, placed at so considerable an angle that the whole of the stream of water may be spread over it. It is provided with pegs so as to divide the water, which then passes in an equable stream into the buddle. The stuff is placed on the head board in a little long heap, and then the man at work cuts with a shovel a proper opening in it through which the water runs, and then loosens and lets go no more than a sufficient quantity to bring it in a state of solution by the water. In the buddles used in the present day the material is thrown into a box, and let go on a grating, a person being placed to watch for and remove stones or straw, or anything which would interfere with the working of the buddle: 10 ft. or 12 ft., by 5 or 6 ft. in breadth, is not an uncommon size for the trough. As the water flows a separation is obtained—first best, then next best, then slime. Care must be taken to guard against an irregular action of the water, and in the pool which is left the sediment will generally be found divisible into heads, middles, and tails. It may be necessary afterwards to further test each of these separately in a similar manner, and so by a series of these buddles the material is brought into a state requiring no further dressing for the market. This is the simplest buddle, but in modern times they have been improved upon by making them of much larger size, and men stand on either side and sweep a light birch broom against the stream to take away rubbish, and to prevent rills on the surface. A great improvement came into play a few years ago, by which these arrangements were turned into a circular buddle. The cylinder is from 16 to 24 ft. in diameter, and the material is introduced at the centre, and radiates towards and is given out at the surface. The most remarkable buddle in the world, perhaps, is that at the Wheal Howel, near St. Just, where Capt. Miles erected one 50 ft. in diameter, which has a central portion of 25 ft. in diameter. In another sort the centre is concave, instead of being convex, and the material starts from the exterior towards the orifice of exit in the centre. These buddles were introduced in Cornwall some years ago, but as they have become very scarce it may be suspected that they have not proved advantageous. Another kind is the "slime buddle," used for the very finest material in some countries where they have to deal with exceedingly tenacious and glutinous substances, and where they are said to be exceedingly useful, and break up and deal with the slimes most effectively; but more information is requisite as to their inclination, size, and velocity.

Another important implement is that called "the frame." In Cornwall it is rectangular, and fitted with a spring. It rests at a certain angle of inclination, and then over that is a head board, on which it is usual to place a couple of, or perhaps several piles of material, and then to allow the stream of water to flow through them, and to run down in an equable stream, depositing at first the richer portions, then the poorer in the middle, and at the lower end the extremely poor. Sometimes the water which runs off is in such a state of clearness that nothing escapes; but as a rule it is best to treat it again in a similar manner. At present the practice is to prepare another box, into which the mixed material is allowed by opening a little "slat" to flow down, and so arranged that when they get a thin layer of deposit they can stop the metalliferous stream, and let in clean water. A kind of frame or buddle has lately been introduced in the Hungarian mines, as a great improvement, in which the frame is suspended by rods of wire or chains. It is thus capable of being thrust forward by a cam on the moving power, and then let back against a strong block of wood, giving a violent shake to the contents. These are called percussion frames (German, "stoss herd"), and are largely employed in the gold and silver mines of Hungary, and with modifications in Saxony and across the Pacific. [The lecturer exhibited diagrams and models with the herd, or frame suspended, showing the construction.] The suspension is by each of the four corners, and the angle may be slightly varied by shortening or lengthening the chains. There are a great many varieties, however, arising mostly out of peculiarities of the material to be dealt with.

A good deal of experience is requisite in the persons who arrange and work these machines; first, as to the size of the frame, which may be either too large or too small for the work to be done; secondly, as to the angle of inclination; and thirdly, as to the amount of attention given to them during the working. The latter is a most important department, for if the blow be given too frequently ridges will be the result, instead of a perfectly even deposit in the order of heads, middles, and tails. It is often done by hand, but the blow is best given by a suitable mechanical arrangement, which may be made longer or shorter to suit the different treatment required by different kinds of minerals. In a table invented by M. Rittinger the movement is imparted by a shaft, which has on it a single cam, which pulls the table out towards the right hand, when, on being released, it flies back against a spring on the other side fixed to a strong framework. By this the material is divided more or less in straight lines, according as it is heavier or lighter. It was shown in the Exhibition of 1862, and was regarded as one of the prettiest examples of the competition of forces ever seen. They have been put up in North Wales, and on a recent visit to the Hartz and Schemnitz, in Hungary, I found them working there in great numbers, making four divisions, in which the first was gold and the other three varieties of galena.

The lecturer then referred to the process of "jigging" (German, "setzen"). In this the material is thrown into a sieve, into which is forced a heavy stream of water, and the material is then stirred with a shovel, working up against the stream to clear away the slime. The process of jigging is effected in a more complete manner by what are called the hydraulic sieves, introduced by Capt. Petherick at Fowey Consols many years ago. They are similar in principle to the ordinary sieves, though different in arrangement. It has been a great object to discover a satisfactory arrangement by which the action may be continuous, and in 1851 M. Bérard exhibited a very ingenious one. The continuous action has been for some time at work in Germany, applied in various ways, and more lately in England. In countries where the larger percentage of silver in the ores renders it necessary that the stream should flow out in such a way as to render the division one of greater nicety than with us, these German machines (of which there is a model upstairs) of M. Rittinger have been found extremely advantageous.

After further descriptions and various illustrative drawings on the board, Mr. SMYTH concluded as follows:—As we have passed from branch to branch of the art of mining, you will have observed that although distinct principles may be traced in every part, the details which differ, and often greatly differ, from each other are innumerable. As these differences arise from the exceedingly varied circumstances under which the valuable minerals are distributed in the crust of the earth, so it is important to the character of an efficient mining engineer or mine manager that he should be well acquainted with those geological conditions which affect, or have affected, particular deposits. One point I would strongly impress upon you. Those who intend to devote their attention to mining, whether exploratory or working, ought before all things to attend to those portions of the subject which theoretically affect it; and then, being masters of the geology and mineralogy, to thoroughly acquaint themselves with the tools with which the miners operate, and the work they do. Unless an engineer does this he will not know what amount of work a man, or so many men, can do, and at what cost; and without this knowledge no one can scarcely hope to carry out successfully any mining. During the progress of any tour you may make for the purpose of examining mines, great attention should be paid to this point. When you see anything which appears to you novel or ingenious, or likely to be useful, the note-book and the measuring rule ought to be constantly employed. If any of you desire it, I shall be very happy to look through any notes you may have taken, and give you my opinion how far you have satisfactorily availed yourselves of the opportunities you have had, and played the part of careful and accurate observers. If you have this in writing it may be useful to you as a special certificate; but if not you will find the use of such recorded observations when you come to be practically employed. No amount of study or theoretical knowledge alone will make a good mining engineer; but a thorough knowledge of the sciences which apply to mining will be of great advantage to a student when he descends into the mines, and proceeds to make himself acquainted not only with the phenomena there developed, but the actual manual labour also. As years pass away, and the valuable minerals nearest the surface are won, the miner must descend deeper and deeper for his prize; and thus every day scientific knowledge will become more and more indispensable, and the art of mining will become one of the very highest as well as one of the most important of those arts which lie at the foundation of human progress, and which in these later times have so greatly promoted the social advancement and ameliorated the physical condition of mankind. (Cheers.)

FIRES IN COAL MINES.

A meeting of the Manchester Geological Society was held at the Museum, Peter-street, on Tuesday, when a paper on the subject of fires in coal mines was read by the President (Mr. J. Knowles).

Mr. DICKINSON, the Government Inspector of Mines for the district, having been called to the chair, Mr. KNOWLES gave a detailed account of the circumstances attending the recent fire in his colliery at Pendleton, which caused the death of six men, and the efforts which were made to extinguish it. He said that water was thrown upon the burning coal—three small fire-engines and a supply of 2-in. iron pipe, beside hose, being used for the purpose—and gradually, owing to the generation of steam, the fire was choked. He would suggest that at every colliery there should be a small fire-engine, or at least a wagon, fitted with pumps, capable of being dispatched to any part of the workings at a moment's notice. The Ram's Mine, Pendlebury, was closed, in consequence of the fire in question, for ten days. Work was resumed, for the first time since its occurrence, on Monday. He estimated the loss to the firm which it had occasioned at about 1500*l*.

Some discussion followed, in which the CHAIRMAN expressed his warm approval of the steps that were taken to extinguish the Pendlebury fire. His opinion at the time was that so large a fire could hardly be extinguished by water, an agent which he had known to fail often; but when he saw how vigorously the men were playing upon it by means of a powerful hand-engine, and the progress that had been made, he encouraged them to persevere. In 16 hours the fire had run up the brow about 60 yards, consuming the coal to a depth of 2 or 3 feet, and yet the men were keeping it well in check. He saw a second engine brought to the front, and finding that all was working satisfactorily, and feeling "knocked up," he ascended the shaft. He was of opinion that the men working the engines at such a fire should be relieved every ten minutes. The result showed how successfully a fire might be dealt with by the use of water. A larger one than this he had never seen extinguished by that agency. With less room to work in the men would not have been as successful as they were. He had known Gurney's plan of extinguishing fires in mines—that of pouring a stream of pure carbonic acid upon the flames—to fail in several instances in which it had been tried. His (the Chairman's) recommendation was that in dealing with fires water should in the first instance be used freely and promptly. If that was not done the fire should be shut off. In the event of that being found impracticable, there was no resource left but to flood the mine; but no mine should be flooded until it was clearly seen, by persons having a knowledge of the subject, that the fire could not be subdued in any other way.

Mr. HERBERT FLETCHER recommended that miners should be drilled periodically in the use of engines and hose.

Mr. T. KNOWLES, Ince, and other gentlemen addressed the meeting; and it was stated in the course of the discussion that Sinclair's *extincteurs* were of no use in mines, because the draught of air was too strong.

THE MINING DISTRICTS OF LAKE SUPERIOR.

At the Geological Society of London, on Nov. 20, Dr. H. ALLEYNE NICHOLSON, M.D., F.G.S., read a paper "On the Geology of the Thunder Bay and Shabendowan Mining Districts on the North Shore of Lake Superior." The author described the general characters of Thunder Bay, which is almost landlocked on the south-east by the bold promontory of Thunder Cape and a series of islands which form a continuation of this. The rocks immediately surrounding Thunder Bay belong to the "Lower and Upper Copper-bearing series" of Canadian geologists. The latter, consisting of sandstones, shales, limestones, marls, and conglomerates, chiefly of a red or reddish colour, with interstratified straps, is regarded by the author as probably of Lower Silurian age, in accordance with the opinion of Sir Wm. Logan. The "Lower Copper-bearing series;" is also very varied in character; it is traversed by trap dykes, and contains several well-marked interstratified traps. It is penetrated by two sets of mineral veins, containing great abundance of silver. The majority of these run along the strike of the beds in a general E.N.E. and W.S.W. direction; the remainder are transverse, running nearly N. and S. Of the latter the most important is the "Silver Islet vein," which is 3 or 4 ft. in width, and consists of quartz with native silver and galena; picked specimens of the stuff have assayed from 1000*l*. to 2000*l*. per ton. This vein has been worked for about two years, and has proved remarkably productive. Of the former series the most important is the "Shuniah vein," which runs along at a distance of 1½ to 2 miles from the north shore of Thunder Bay, the mines in which, although quite in their infancy, promise excellent results. Its width is 22 ft., and the veinstuff consists mainly of calc-spar. The silver is present in the native form, and as sulphide. The vein traverses hard black shales, but does not run exactly along the strike of the beds; it may be traced for several miles towards the east.

The country between Thunder Bay and Lake Shabendowan, along the "Dawson-road," is of an undulating character, and the surface of its fundamental rocks everywhere exhibits unmistakable evidences of glaciation, the general direction of the striæ being N. and S., but with the occasional occurrence of a minor set of grooves running nearly E. and W. The greater part of the country is thickly covered with drift, composed of rocks which appear to have travelled from north to south. The rocks passed over between Thunder Bay and Lake Shabendowan are described by the author as, 1, the shales and traps of the "Lower Copper-bearing series;" 2, a range of syenitic and gneissic rocks, probably of Laurentian age; 3, a great series of rocks belonging to the Huronian group, consisting of greenish or grey slates, with bands of gneiss and trap dykes, and bedded green traps, with great masses of greenish, grey, or drab-coloured slates, the whole presenting a close resemblance to the green slates and porphyries of the English Lake district. The slates, in the author's opinion, are bedded felspathic ashes.

The author described the general characters of Lake Shabendowan, and stated that from the foot of the lake for about 15 miles westward there is a succession of trappean rocks, beyond which, to the head of the lake, distant 13 miles, the country is occupied by Huronian slates like those between the lake and Thunder Bay. These slates extend for an unknown distance north-west of the head of the lake, and contain numerous veins, having an E.N.E. and W.S.W. direction, conformable with the strike of the beds, and some of them are auriferous. The veinstuff is quartz, containing copper pyrites; the gold is contained in the copper pyrites, or disseminated in very minute grains through the quartz. Several of these veins are being worked, and their peculiarities were noticed by the author.

Mr. H. WOODWARD mentioned that Dr. Nicholson had presented to the British Museum some of the rich specimens of silver ore described in the paper.—Mr. D. FORBES corroborated the author as to the richness of the ore. A lump which had been submitted to him, weighing 295 lbs., contained no less than 187 lbs. of silver. He called attention to the resemblance between the veinstuff from Thunder Bay and that from the Kongsberg silver mines of Norway, many specimens being so much alike that it was impossible to distinguish them.

THE INVESTORS' DIRECTORY.—The little volume just issued under this title by Messrs. BARTLETT and CHAPMAN, stock and share dealers, Cornhill, is really extremely cleverly written, and embraces nearly every class of security likely to prove attractive to capitalists generally, including British Funds, Indian Government Securities, Foreign Securities, Selected Foreign Bonds, Colonial Government Securities, British Railways, Foreign Railway Obligations, London Joint Stock Banks, British Mining Companies, Selected Dividend and Progressive Mines, and Foreign Mines. It is remarked that of all Government debts those of Foreign States stand the lowest in point of security, for although repudiation has become a luxury, which States generally are obliged to forego whatever the temptation to indulge in it may be, there are contingencies attaching to them, from which most others debts are free. As to Colonial Government Securities, all the colonies are in a highly prosperous condition, and the dividends and drawings of the respective bonds are punctually observed. The increased working expenses of British Railways through rise in the price of coal, and in the standard of wages, appears to have been compensated by the increased traffic returns. Foreign Railway Obligations are deemed to offer very eligible investments for persons having only comparatively small sums thus to employ, inasmuch as they are small in amount are pretty certain of having their dividends punctually paid, being the first mortgages on the revenues of the several companies, and are still quoted below their real value, although the increased attention that has been paid to them for some time past has tended to enhance the market price. There is less speculation they consider in the shares and stocks of London Joint Stock Banks than in any other, perhaps in the markets, the law requiring that such particulars should be given in the transfers as to render it difficult to deal otherwise by them than in actual and *bona fide* transactions. With regard to mining investments they repudiate the idea that they are more dangerous than others, and state that the profits of mining have been larger than the profits of anything else—in proportion to the bulk of the products. Within the last 20 years the mines worked in this country by public companies have had about 2,000,000*l*. invested in them, but they have returned profits to the amount of nearly 7,000,000*l*., and add 33,000,000*l*. a year to the national income, so that the adventures are not barren in their results either to the persons who have supplied the capital, or to the country at large. But the most important feature in the book is the selected list of investments, which yield given percentages of annual profit from 4% to 14 per cent. per annum. No capitalist should make an investment without first studying the book.

COAL AND COAL MINING.

The frequent publication in the *Mining Journal* of reports of the lectures delivered at the Royal School of Mines, by Mr. WARINGTON SMYTH, M.A., F.R.S., will have sufficed to give confidence in his ability to deal with the subject, and the issue of the second edition of his really useful little volume* will afford those who have not had the advantage of attending his lectures an opportunity of learning much that they will find it useful to know. Mr. Smyth remarks that in the interval which has elapsed since the issue of the first edition the most notable phase in coal mining has been the attention bestowed by coal viewers and engineers on the further application of machinery to three departments of their art—the getting of coal, the underground haulage, and the ventilation of the works; he mentions, moreover, that many coal-cutters, and several ingenious contrivances for wedging down coal by hydraulic power, have been patented, but neither of them has yet been so commonly applied as to need full description in a work professing only an elementary and general character; this is, in fact, a mild mode of stating that neither of the inventions have fulfilled the anticipations formed of them. The object of the book is to supply a general view of the methods and appliances employed in various districts, giving the fuller prominence to a description of the principal coal-producing regions at home and abroad, and of the various precautions needed for the preservation of human life.

The book, as will be recollected from the first edition, is of a thoroughly popular character, and describes the commencement and extension of the use of coal; its mode of occurrence, its origin, and the organic remains found in it; the coal fields of the North, Central England, West of England, South Wales, and Ireland, Continental Europe, North America, Asia, and of the southern hemisphere; whilst with regard to the making of the mineral marketable he explains the mode of searching for coal, boring and sinking shafts, driving levels and cutting the coal, post and stall and long work, conveyance underground, raising the mineral in the shafts, drainage and pumping, lighting of the workings, ventilation, and colliery accidents and their prevention. His reference to wages in the latter chapter is well worthy the consideration of Cornishmen who entertain the erroneous notion that if they are dissatisfied with the wages they are receiving the only remedy is to emigrate. Mr. Smyth remarks that our Cornish miners, fagged by climbing and by high temperature, contending with the rocks of excessive hardness, and after all earning rarely more than 3*l*. 10s. or 3*l*. 15s. per month, offer a strange contrast to colliers of the North, who can commonly make their 6s. per day, and have often houses free of rent and coals, and schooling for their children at a nominal charge; and to the Welsh colliers, who in a good stall of the rich Aberdare coal will get their 8s. or even 10s. a-day. The concluding chapter is devoted to the consideration of the Duration of the British Coal Fields.

Every portion of the volume appears to have been prepared with much care, and as an outline is given of every known coal field in this and other countries, as well as of the two principal methods of working, the book will doubtless interest a very large number of readers. The treatise only professes to be rudimentary, but as such it is very complete and useful.

*"A Rudimentary Treatise on Coal and Coal Mining." By WARINGTON W. SMYTH M.A., F.R.S., &c. Second Edition, revised and corrected. London: Lockwood and Co., Stationers' Hall Court.

COLLIERIES AND COLLIERS.

THE NEW COAL MINES REGULATION ACT, 1872.

For some years past the work which has undoubtedly enjoyed the largest share of the confidence of magistrates and others entrusted with the administration of the law of collieries, as well as of coal-owners and managers, has been the very excellent hand-book,* by Mr. J. C. Fowler, the Deputy-Chairman of the Glamorganshire Sessions; and, as he has now published the third edition of the work embodying the new Act complete, it will, without question, continue to occupy the same prominent position as it has done hitherto. With regard to the provisions of the new Act, he points out that it contains new regulations relating to the employment of women, young persons, and children, prohibits the payment of wages in publichouses, enacts regulations for weighing the coal gotten, prohibits single shafts, with certain exceptions, and regulates the division of mines into parts. Every mine is to be under the control of a manager, who will not be qualified unless he be registered as the holder of a certificate of competency from examiners to be appointed for the purpose. Returns of various particulars of mines are to be sent to the Inspector; also notices of opening and abandoning, and of personal changes in the management and ownership of collieries; provision is made for arbitration between inspectors, managers, and owners, and for inquests on deaths from accidents in mines. The general rules are increased in number from 15 to 31, with a view to ensure the safety of the miners, as much as possible. Lastly, it is enacted that, in addition to the former pecuniary penalties, the owner, agent, or manager who is guilty of any offence, personally and wilfully committed, which is likely to endanger the safety of the persons employed shall be liable to imprisonment with or without hard labour for three months; but no prosecution is to be instituted against such owner, agent, or manager before a court of summary jurisdiction except by an Inspector, or with the consent of a Secretary of State.

The volume under consideration is so complete a treatise upon the entire law that there are few cases likely to arise in connection with the subject of collieries or colliery management which could not be fully discussed and properly dealt with by taking this book alone as a guide. Commencing with an explanation of the nature of property in coal, Mr. Fowler proceeds to the consideration of leases of mineral property, covenants to work the coal, title by prescription, fixtures, rights of way, rights connected with the flow of water, partnership in collieries, the contract of hiring between masters and colliers, statutes relating to labour in collieries, and the various matters of dispute arising between masters and workmen. The several questions of accidents, truck, combinations amongst workmen, and criminal law relating to collieries.

Altogether the book will be found a most valuable companion to all connected with collieries, or who intend to become so, since in addition to the new act Mr. Fowler supplies, by way of appendix, models of leases of collieries, coal wayleaves, miscellaneous covenants and provisoes taken from various mineral leases (so that all chance of subsequent legal difficulties may readily be provided against), and an epitome of the French mineral laws. The work should be in every colliery office, and should be carefully studied by every colliery manager.

* "Collieries and Colliers: a Handbook of the Law and Leading Cases Relating thereto." By JOHN COKE FOWLER, Deputy-Chairman of the Glamorganshire Sessions, and Stipendiary Magistrate of Swansea. Third edition, with the Coal Mines Regulation Act, 1872, and a new Preface. London: Longmans, Green, and Co.

STEEL AND IRON.—Mr. E. G. BREWER, of Chancery-lane, has patented (for F. G. Bazault and I. J. Roche, of Paris) some improvements in the manufacture of steel, steely iron, and homogeneous metal, and in apparatus therefor. The invention consists in the manufacture of steel and iron by cementation at a lower temperature than fusion temperature; of a mixture of cast-iron with rich mineral or iron oxide, with or without the addition of carburetting or other material contained in fusible crucibles or stratified in ordinary crucibles, or on the bed of a reverberatory furnace; and the ultimate fuston of the mixture. The invention further consists in the employment of fusible crucibles made of cast-iron or of other metal or fusible materials, for holding during the cementation the mixture of iron oxide or mineral with the cast-iron or other materials, together or separately, to be subsequently melted with the contents thereof.

ROCK-BORING MACHINERY.—Mr. WATTEEU, of the Royal Exchange, Middlesborough-on-Tees, has patented (for Joseph François and Guillaume Dubois, of Liége), some improvements in machinery or apparatus for driving holes or driftways in rocks. This invention has reference to machinery where a piston receiving reciprocating motion by compressed air or steam inside a cylinder carries a chisel for driving holes by concussion: the improvements consists—firstly, in a peculiar arrangement for actuating the slide-valve of the cylinder. The slide valve is connected at its opposite ends to two pistons working in cylindrical holes in the slide-valve box; the steam or air under pressure has access to both sides of the one piston, while the other piston (of smaller diameter than the first) is acted on the one side only by the steam or air under pressure, the other side being opened to the atmosphere. An escape valve, actuated by a trigger and a tappet on the piston-rod of the machine, allows the steam or air to escape from the one side of the first slide-valve piston at the end of the back stroke of the machine, whereby the one motion of the slide-valve is effected for producing the forward stroke of the chisel. On the closing of the said valve an equilibrium of pressure is re-established on the said slide-valve piston, so as to produce the return stroke of the slide-valve. The driving chisel is rotated at each stroke by a pawl and ratchet wheel, actuated by a bar receiving a rocking motion from two small pistons in cylinders, into which the steam or air under pressure is admitted alternately.

NEW GUNPOWDER.—A novel description of gunpowder possessing extraordinary projectile power, is said to have been recently adopted by the Prussian artillery. It is composed of a certain proportion of nitre and sawdust, and in this state can be kept in store without fear of explosion. To render this composition explosive it is necessary to add a sufficient quantity of sulphuric acid to make it cohere, and when dried it is ready for use. This composition has certainly the advantage of cheapness, combined with extreme simplicity in its manufacture, and is said to leave but little residue after being fired.

HONOUR TO INVENTORS.—We learn with pleasure (says the *Mechanics' Magazine*) that a portion of the New York Central Park has been selected for the location of memorials to the inventors of all nations, and that one of these memorials is to be erected to Elias Howe, "the inventor of the sewing machine." The good fortune to bestow equal benefits on mankind is reserved to few inventors, and a large share of the legacy has fallen to our countrymen. While all classes have been benefitted, the object appeals especially to the sympathies of the inventive class, of which Mr. Howe was an illustrious representative. The estimated cost of the memorial is 850,000 (10,000*l*.) The committee of the memorial fund, formed in this country, includes among others Sir William Fairbairn, Bart., Bennett Woodcroft, F.R.S., Donald Nicoll, Esq., P. Le Neve Forster, M.A., Thomas Webster, Q.C., F.R.S., George Haseltine, LL.D., David Chadwick, M.P., William Muir, C.E., Dr. Charles W. Siemens, F.R.S., and other eminent inventors have tendered their co-operation. The composition of the committee indicates general interest in the movement, and is an earnest of its success. Truly, the victories of peace are nobler than the victories of war, and the veneration of the heroes of these victories illustrates the spirit of modern civilisation.

THE COAL MINES REGULATION ACT, 1872.—We are informed that Mr. Maskell W. Peace's treatise on the Coal Mines Regulation Act, 1872, has been delayed in the press, in order that it may include an appendix containing a complete set of the official forms to be used under the Act. It will be ready, however, in the course of a few days.—*Colliery Guardian.*

IRON ORE PRODUCE IN ENGLAND DURING 1871.

GENERAL SUMMARY OF RETURNS.

Counties, &c.	Quantities, &c.	Value.
Cornwall ..... Tons	21,947 14	£ 11,509 8 3
Devonshire	14,124 14	6,095 16 0
Somersetshire	32,883 13	32,883 13 0
Gloucestershire	207,598 16	155,060 0 0
Wiltshire	159,894 0	27,989 0 0
Oxfordshire	28,330 0	21,247 0 0
Northamptonshire	779,314 3	133,155 18 0
Lincolnshire	290,673 9	50,705 0 0
Shropshire	415,972 0	157,083 0 0
Warwickshire	34,075 0	15,570 0 0
Staffordshire—North	1,513,080 0	921,022 0 0
,, South	765,065 0	453,512 0 0
Derbyshire	492,973 0	295,782 0 0
Lancashire	931,048 0	1,163,810 0 0
Cumberland	1,302,703 15	1,448,975 0 0
Yorkshire { North Riding	4,581,901 0	1,144,974 2 0
Yorkshire { West Riding	407,997 0	101,998 10 0
Northumberland and Durham	285,297 0	71,349 0 0
North Wales	51,887 0	23,348 0 0
South Wales and Monmouthshire	969,714 10	543,422 16 0
Isle of Man	75 0	37 10 0
Scotland	3,000,000 0	825,000 0 0
Ireland	107,734 0	66,043 0 0
Total United Kingdom	16,334,888 14	£7,670,572 13 8
Burnt ore, cupreous pyrites	200,000 0	—
Iron ore imported	324,175 0	—

SUMMARY OF PIG-IRON PRODUCE.

Counties.	Ironworks active.	Furnaces built.	Furnaces in blast.	Tons of pig iron made.
Northumberland	2	10	3	34,165
Durham	12	61	47½	759,244
Yorkshire—North Riding	17	75	70	1,029,885
,, West Riding	9	39	25	114,549
Derbyshire	12	46	38	270,485
Lancashire	7	41	34	520,359
Cumberland	8	34	28¾	336,569
Shropshire	19	25	19	129,467
North Staffordshire	7	35	30	268,300
South Staffordshire	53	163	18	725,716
Northamptonshire	5	12	9	60,512
Lincolnshire	3	7	4	30,122
Gloucestershire, Wiltshire, Somersetshire	6	18	13	99,997
Total	160	566	429¼	4,379,370
North Wales—Denbighshire	3	8	5	41,693
South Wales—Anthracite furnaces	2	19	8	34,761
Bituminous Coal Districts. { Glamorganshire	15	72	53	510,087
Bituminous Coal Districts. { Brecknockshire	1	14	4	30,086
Bituminous Coal Districts. { Monmouthshire	11	62	47	470,982
Total	32	175	117	1,087,809
Scotland—Ayrshire	7	43	35	—
Lanarkshire	13	92	79	—
Fifeshire	2	6	3	—
Linlithgowshire	2	6	4	—
Stirlingshire	2	7	5	—
Haddingtonshire	1	1	1	—
Argyleshire	0	1	0	—
Total	27	156	127	1,160,000

SUMMARY OF MILLS AND FORGES AT WORK IN 1871.

County.	Works.	Puddling furnaces.	Rolling mills.
England—Northumberland	2	54	5
Cumberland	6	95	15
Durham	21	951	65
Yorkshire (Cleveland district)	11	542	34
,, (Leeds and Bradford district)	13	247	59
,, (Sheffield and Rotherham district)	10	353	54
Derbyshire	5	94	19
Somersetshire	1	19	2
South Staffordshire	122	2037	320
North Staffordshire	8	429	40
Shropshire	9	218	28
Lancashire	10	154	35
North Wales	3	54	6
South Wales—Glamorganshire	17	613	92
Brecknockshire	2	86	7
Monmouthshire	12	553	42
Scotland	14	339	41
Total	267	6841	866

ARSENIC PRODUCE IN ENGLAND DURING 1871.

No. Mines selling Crude Arsenic.	Quantities.	Value.
Cornwall:—		
1.—New Great Consols ..... Tons	610 9 0	£ 1,387 11 5
2.—Wheal Seton	265 18 0	401 10 1
3.—North Roskear	190 6 2	355 5 8
4.—North Wheal Crofty	141 0 0	515 5 11
5.—North Wheal Crofty	168 14 0	297 16 8
6.—East Pool	133 6 0	300 0 0
7.—Carn Brea	101 1 0	167 14 0
8.—West Wheal Seton	82 11 1	125 4 6
9.—Dolcoath	59 0 0	79 15 0
10.—Wheal Prosper	60 0 0	67 10 0
11.—Redmoor	23 4 0	29 0 0
12.—Great Western	20 0 0	10 0 0
13.—Nangiles	4 0 0	4 10 0
14.—Wheal Jane	0 16 0	0 16 0
15.—Okel Tor	67 5 2	115 0 0
Devonshire:—		
1.—Devon Great Consols	2220 3 3	11,862 19 6
Total	4147 15 0	£15,519 18 9

(Stannary returns.)

IRON AT THE ANTIPODES.

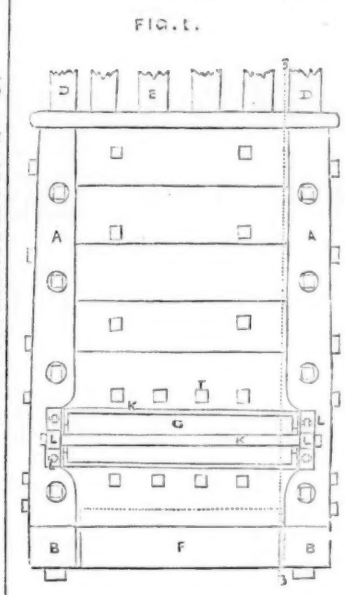
It is, of course, a matter of much interest to the coal and iron trades to follow the course of Australian affairs. At present the consumption of our railway iron in the Australian colonies is comparatively small, having amounted in the five months ending May 31 this year, to only 6901 tons, as compared with 8922 tons in the five corresponding months of 1871, and 4629 tons in the corresponding period of 1870. No doubt the high rates which have prevailed recently have a tendency to check consumption; still there appears no reason to suppose that a considerable demand for railway and other iron on Australian account is not one of the probabilities of the future, although a renewed effort is about to be made to commence the manufacture of iron in New South Wales. In Victoria the development of railways is certainly attracting more attention than has been accorded to the subject for some years past. The costliness of the Government railways first constructed in Victoria deterred for some time the prosecution of other lines in the colony; but the gradual growth of wealth and population has had the effect of reviving to rather an important extent Victorian railway credit, and now once more the engineer and the navvy are beginning to be rather busily employed at the other end of the world. At present the railways of Victoria are being made by the Government of Victoria, and the sum of 200,000*l.* per annum is being devoted to extensions. But if fresh railway enterprises are to be developed in Victoria to any material extent—if Gipps Land is to have its line, if the claims of Pleasant Creek and Hamilton are not to be forgotten, and if the South Australian border is to be visited by the iron horse—it is clear that the Victorian treasury will have to contract a fresh railway loan. This is, however, not a matter of much moment, as the Victorian Finance Minister will have no difficulty in raising all the capital which he requires at 5 per cent., Victorian 5 per cents. now standing in the London money market at about 108*l.*

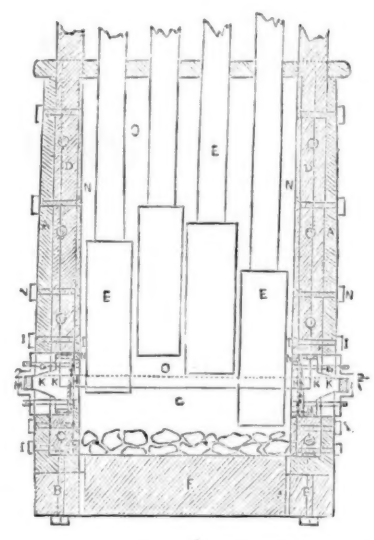
The efforts made in Victoria of late years to carry out a cheaper system of lines in that colony have not been without success. The North-Eastern Railway of Victoria is now open to Seymour, and so far the experiment of economical construction has proved encouraging. The testimony of those who have made experimental trips upon the new line shows that for solidity and steadiness it is not excelled by any in Australia, while the cost of the permanent way has not exceeded 5500*l.* per mile. Even with the rolling stock the cost has not been more than 7500*l.* per mile, or about one-fifth the amount of money expended on the main lines to Sandhurst and Ballarat. It is, therefore, by no means unreasonable to presume that with the adoption of a still cheaper mode of construction, and a narrow gauge, railways can be made in Victoria at 5000*l.* per mile, especially in localities where there are no great engineering difficulties, and where there is no dividing range to cross. Of course, something of the relatively moderate cost of the North-Eastern Railway of Victoria is due to the fact that although the wages paid to their workpeople by Messrs. Cornish and Bruce, the contractors for the original Victorian lines, were not greatly in excess of those now current, it was anticipated when Messrs. Cornish and Bruce's contract was taken that much more would have to be conceded to their workmen, and their calculations were based upon that imaginary hypothesis. It is satisfactory to find that the results attained in the construction of the North-Eastern Railway of Victoria are encouraging, because there is clearly room for a large extent of new railways in Victoria. Compared with other countries and colonies, Victoria must be said to possess only an infant railway system. Including the finished portions of the North-Eastern line, Victoria has only 326 miles of railway open, while the United States have 48,860 miles; the British Isles, 15,537 miles; and British India, 4182 miles. The Dominion of Canada presents a striking comparison with Victoria in the matter of railways. The revenue of Canada is not much larger than that of Victoria, and the trade of the Dominion does not exceed that of Victoria by more than 25 per cent. Yet, in the Dominion of Canada there were recently 2694 miles of railway, or nearly nine times as much railway mileage as existed in Victoria. It is quite clear, then, that there is plenty of room for railway progress in Victoria. We have dealt hitherto exclusively with Victoria, but what is true of Victoria applies also to New South Wales, to Western Australia, to South Australia, to Tasmania, to Queensland, and to New Zealand. As population accumulates in all those vast settlements there must of necessity be a demand also for more railways, and especially for cheap railways; but it is clear that the present extremely high rates prevailing for iron in the British Isles must exercise a chilling influence upon railway enterprise, not merely in Australia but in every part of the world. With earthworks made ever so cheaply, dear rails must for the present render Victoria and New South Wales railways relatively expensive, and, must to some extent, retard their progress.

Improved Steam-Engine.—An arrangement of steam-engine so that it can be worked at pleasure, either both cylinders high pressure or one high and one low combined, has been invented by Mr. W. Baxter, of Newark, New Jersey. The improvement relates to steam-engines designed to serve as railway engines or as traction engines for street cars, steam ploughs, and for other like purposes. In carrying this invention into practice, he employs in connection with a boiler of suitable construction and two or more steam-cylinders arranged in such manner that the steam from one may be exhausted into and used expansively in the other, a steam chamber or space so connected with the boiler and cylinders that—first, it will receive the exhaust steam from one cylinder and transmit it to the other where it is used expansively. Secondly, it will when the engine is at rest accumulate the steam generated by the boiler until the steam it contains stands at the same pressure as that in the boiler, and will, when the engine again moves transmit this steam to the cylinder which ordinarily receives the exhaust steam, whereby both cylinders will have the same or nearly the same steam pressure in starting the car, thus furnishing the extra or reserved power necessary to put the car in motion. Thirdly, should a heavy or long up-grade be encountered requiring a long continued increase of power, communication between the steam chamber and the boiler may be opened, so as to permanently or for as long a period as required increase the pressure in the exhaust cylinder to the extent desired. Fourthly, should this power be insufficient it may be still further increased by cutting off the exhaust steam of the first cylinder from the second, in which it is ordinarily used expansively, and opening communication between the steam chamber and the boiler, using live steam at full pressure in both cylinders, making both of them high-pressure for the time being. Thus, with an engine of (say) 4-horse power nominally, the power can be increased to 20 or 24-horse power, as would be the case when both cylinders use live steam. A boiler such as ordinarily used, with an engine of the nominal power first named, will be sufficient to supply the steam needed for two cylinders when working high-pressure steam, for the two cylinders when thus operating would increase the draught causing the boiler to generate steam rapidly, while the car going up a steep grade would run more slowly, and the engine would consequently work off a less number of cylinders full of steam per minute.

Detecting Potassa by the Flame Test.—The difficulty of detecting the potassa flame when the proportion of potassa in soda salts is very small is well known; but Prof. H. B. Cornwall, M.A., M.E., of Columbia College, New York, has discovered that the use of a solution of the pure permanganate of potassa entirely removes the difficulty. Brought into solution with hydrochloric acid, heulandite, analcite, and thomsonite, all of which contain a little potassa, each gave a perfectly distinct potassa flame through the permanganate of potassa solution, by the use of which pure chloride of sodium was repeatedly and with certainty distinguished from the same chloride with the addition of only 0·1 per cent. potassium, the latter being added as carbonate with a drop or two of hydrochloric acid. Even with a pocket spectroscope, by Browning, of London, the potassa could not be detected with any certainty owing to the brilliancy of the soda spectrum, and in the majority of the zeolites it could only be detected with this instrument by an experienced observer, while with the permanganate solution it was obvious on the most casual examination. The transparency of such a solution to the luminous rays from the potassa flame is quite surprising. If kept in a dark place in a tightly closed vessel, with just enough air to allow for expansion, the permanganate solution will last for a long time. When necessary the permanganate solution may be replaced by a solution of aniline colours, having *exactly* the same colour by transmitted light; if too blue the soda flame passes too easily, if too red the lithia. Either solution is best used in a wedge-shaped bottle, 8 in. long, as thin as possible at one end, and 1 in. thick at the other; the solution being so strong that 1½ in. from the thickest end it is opaque to the most powerful soda or lithia flame. Care must be taken that the soda or lithia salts used to test the solution contain no potash. Silicates, which always yield a more feeble soda flame, may be tested at the middle of the prism if no lithia be suspected, and then the potash flame is slightly stronger; silicates, decomposed by acids, are best tested, after decomposition, in very concentrated solutions, but in all cases the test may be made in an easier though rougher way, by simply heating the finely powdered substance on platinum wire with a mixture of two parts gypsum and one part fluor-spar. Soluble salts are simply moistened in water. For the purpose mentioned the permanganate solution is scarcely second to a good spectroscope.

TREGAY'S IMPROVEMENTS IN STAMPING.





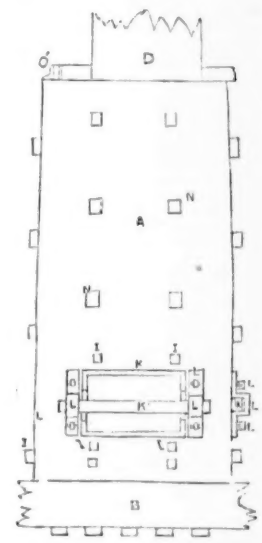
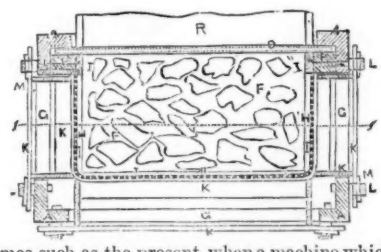


FIG. 3.



At times such as the present, when a machine which has done such good service as the old Cornish stamps has done in every part of the mining world is *attempted* to be superseded, it behoves all interested in mining, metallurgy, or mechanics to enquire into the relative qualities of each and every machine in competition. We do not say that something better may not yet be applied in pulverising gold quartz, tin, and other ores; but we think that all the new machines must do something more than either has yet attempted to prove nearly equal to the Cornish stamps when properly applied. Consequently, we have to call the attention of our readers to an arrangement in stamping, now in daily operation, which seems to us to very materially affect the question at issue, by showing that the Cornish stamps can and does pulverise quite double the quantity of ore generally imputed to it. We refer to the mode of discharging the stamped ore, as herein represented.

This is an improved arrangement, invented by Mr. W. Tregay, of Pedn-an-drea, Redruth, Cornwall, for the purpose of facilitating the discharge of comminuted ore in the process of disintegration by stamping. In the treatment of ore, especially of the softer kinds, with only a moderate supply of water, it is found in general to be more difficult to get the stamped ore freely through the grate than to obtain the requisite degree of fineness of reduction. So much of the already reduced ore as is driven against the sides and angles of the ordinary "coffer" falls back under the stamper, and reduces the efficacy of the next blow. At the same time this material, which is already fine enough, gets reduced still more, and the result is that the quantity of slime produced is unnecessarily great.

This defective action is effectually remedied by Mr. W. Tregay's "Stamp Coffer," in which the improved arrangement admits of the grate surface being more than doubled, resulting in a porportionate increase in the quantity of stuff stamped. The following description and the accompanying illustrations will clearly explain the whole improvement:—

Fig. 1 is a front elevation of the "coffer" or "cover." *Fig.* 2 is a longitudinal section of the same, taken on the line 1, 1 of *Fig.* 3. *Fig.* 3 is a section of the "coffer" taken horizontally through the grate-way on the line 2, 2 of *Fig.* 2. *Fig.* 4 is an end elevation of the "coffer." Similar letters of reference indicate the same parts in all the figures.

A is the frame of the coffer, constructed preferably of cast-iron. Each stanchion, A, is cast with a flange at the bottom, by which it is firmly bolted to the wooden sleepers, B. C is the coffer in which the ores are pulverised by the stamps, E. To the stanchions are bolted the oak posts or standards, D, which support the framework or upper part of the apparatus. The stamps with their lifters may be raised by cams as usual or in any other suitable manner; F is the iron bottom or bed on which rest the substances to be broken.

The stanchions have an opening, G, a similar opening being provided on either side of the coffer, so as to afford a clear grate-way or discharge-way on all sides, entirely unobstructed by the framework, thereby permitting a freer egress to the pulverised substances. The stanchions are formed with angle pieces at the corners of the coffer, to which the boards forming the front of the coffer are bolted. H is the "grate." It consists of a perforated sheet of metal extending round the interior to the coffer on every side where the grate-way is situate. In the figures this is shown on three sides only of the coffer, the opening at which the coffer is charged being situated on the fourth side, but the discharge might be easily arranged for the fourth side also. The angles of the stanchions, A, stand off from the angles of the grate, the entire surface of which is, therefore, utilised, not being partially blocked up by the framework of the coffer as hitherto. I is a metal lining or frame bolted on the inside of the coffer around each opening, G, by bolts, I', passing through the stanchions, A. The grate, H, is clamped firmly against this lining, I, by a frame, K, placed within the opening or discharge-way, and having projected lugs on the back, by which the frame is pressed against the grate, and secured by a cross-bar, K', passing through the staples, L, and pressed home by wedges, M. N' are metal plates, secured by bolts, N'', with which the interior of the coffer is lined as usual, and O is an iron shutter sliding in grooves in the framework of the coffer, and serving to regulate the supply of the substance to be broken. It is supported by the angle-iron resting on the top of the "foot-piece," A. P, P, are wood blocks with which the back angles may be filled when the grate is made to end there, instead of being carried quite round the coffer. This is sometimes done in order to open a broad aperture, R, for charging at the level of the grate-hole, which would otherwise have to be done above that level. In the latter case the grate, H, would be carried round all four sides of the coffer clear of the rear angles. In this case a clamping device would be applied to the rear opening, to hold the grate the same as for the other openings. In the coffer shown the material to be pulverised is fed through the aperture, R, *Fig.* 3, by a pass leading from the hopper containing the supply, the amount of opening being regulated in the usual manner by the shutter, O.

The real improvement effected by this advantageous arrangement is obvious; and as it has now for several months been in full work at the Pedn-an-drea Tin Mines, where it may be seen in operation, it has been fairly tested, and the results are highly satisfactory. Each coffer contains a battery of four stamp-heads, and discharges 8 tons per day, reduced from the size of paving stones to the finest state necessary for the effectual separation of the tin ore from its gangue. When it is considered that the corresponding yield of a similar battery of the ordinary construction is 4 tons only, it will be readily understood that Mr. Tregay's invention is calculated materially to increase the production, with economical results, and will, therefore, be found well worthy of attention and adoption.

Notwithstanding all the noise made and making by the recent wonderful inventions and improvements in stamping Mr. Tregay has worked quietly, and proved his invention a great success, which will bear favourable comparison with any yet introduced. The number of lbs. of coal consumed, 40 lbs. only, to stamp 1 ton of the hardest tin-stuff, through the finest grate used in the mines, is far below anything we have ever before heard of. We must think that is still the only true test of the perfection of any stamping machine. Would-be inventors of new stamps must not only beat the old Cornish stamps as it is, or rather as it was, but they must beat it with all its accumulated and increased power under this its latest improvement, and in the hands of one who shows how to give it practical effect.

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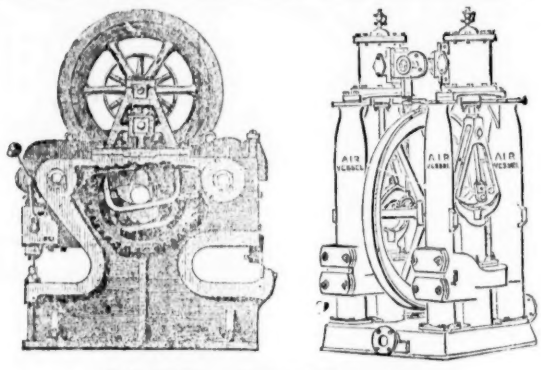

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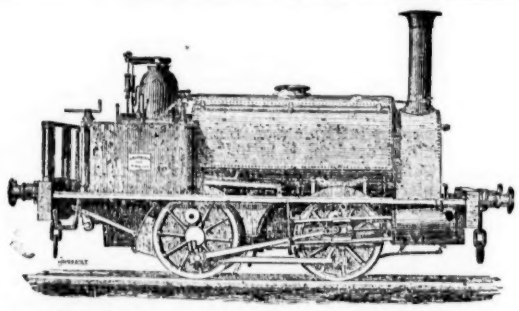

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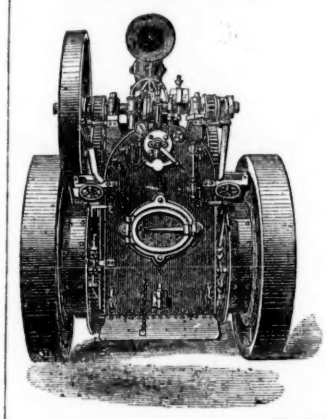

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Middleton Agricultural Show, Sept. 18, 1872.

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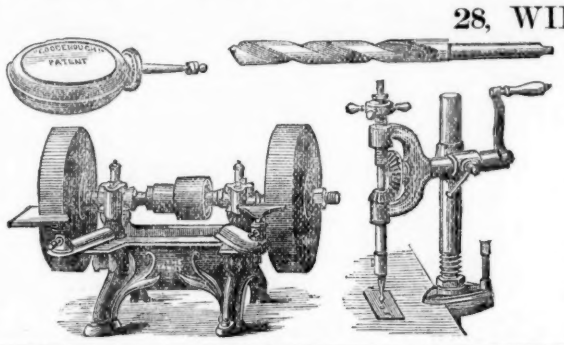

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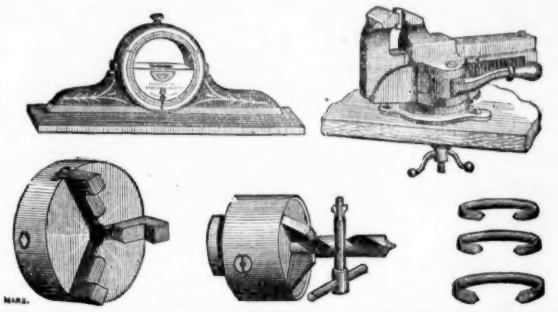

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THE

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Having purchased from the Trustee of the late Firm of W. Charles and Co. the extensive works, with the valuable and improved machinery, are prepared to execute orders for every description of RAILWAY SPRINGS.

PROTECTION FROM FIRE!

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DOGS OUT OF CONDITION ARE PROMPTLY RESTORED by the use of NALDIRE'S POWDERS, which remove worms, give tone to the stomach, and produce first-rate condition.
In packets—2s., 3s. 6d., and 5s.—of all Chemists: or by post of BARCLAY and SONS, 95, Farringdon-street, London.

PATENT STEAM EARTH-BORING MACHINES

FOR

MINERAL EXPLORATIONS

AND WATER SUPPLY,

Capable of BORING HOLES from 6 to 36 in. diameter, and to any depth to 2000 ft.

Price, and terms of hiring, may be obtained from the Patentees,—

MATHER AND PLATT,

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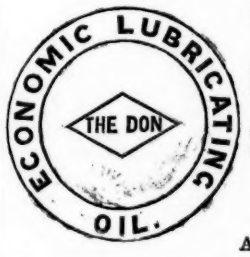
LARGE PUMPS, PUMPING ENGINES, WINDING ENGINES, &c.

THE DON ECONOMIC LUBRICATING OIL

IS 40 PER CENT. CHEAPER THAN THE ORDINARY KINDS.



MR. ALFRED HEWLETT, of the Wigan Coal and Iron Company, says:—"I have used it for two years, and find it to answer exceedingly well for lubricating purposes."

MR. NASMYTH, the Inventor of the Steam-Hammer, says:—"I am highly pleased with it as a most effective and durable lubricant, having remarkable properties in the way of setting free bearings which had got set fast."

In face of these and hundreds of other letters to the same effect, it is a MERE WASTE OF MONEY to use the dearer kinds for the engines and machinery of collieries and mines, numbers of which are now using the Don Oil instead.

Any company desirous of trying it before adopting it may do so at our risk and expense.

Circulars containing particulars sent on application.

PRICE—By the Ton of 253 Gallons, 2s. 6d. a gallon; by the Cask of 40 Gallons, 2s. 9d.

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DUNCAN BROTHERS,

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CHAS. PRICE AND CO.'S RANGOON ENGINE OIL,

AS SUPPLIED TO H.M. DOCKYARDS AND FLEET.

THIS OIL is suitable to every kind of Machinery. As a lubricant it is equal to the best Sperm or Lard Oil, while it possesses the great advantage of being entirely free from any principle which will corrode the metal bearings.

For particular kinds of Machinery, the Oil may be specially prepared of a consistency and character adapted to the nature of the work to be done.

"Chemical Laboratory, 7, Printing House-square, Blackfriars, April, 1869.

"I herewith certify that the Rangoon Engine Oil, manufactured by Messrs. Chas. Price and Co., is free from any material which can produce corrosion of the metal work of machinery. It is indeed calculated to protect metallic surfaces from oxidation.

"The lubricating power of this oil is equal to Sperm or Lard Oil.

"T. W. KEATES, F.C.S., &c. &c

Every parcel of the Oil sent from the work bears the Trade Mark of the Firm.

LONDON: CASTLE BAYNARD, UPPER THAMES STREET.

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TANGYE BROTHERS AND HOLMAN,

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CORNWALL WORKS (TANGYE BROTHERS), BIRMINGHAM,

SOLE MAKERS OF

THE "SPECIAL" STEAM PUMPS.

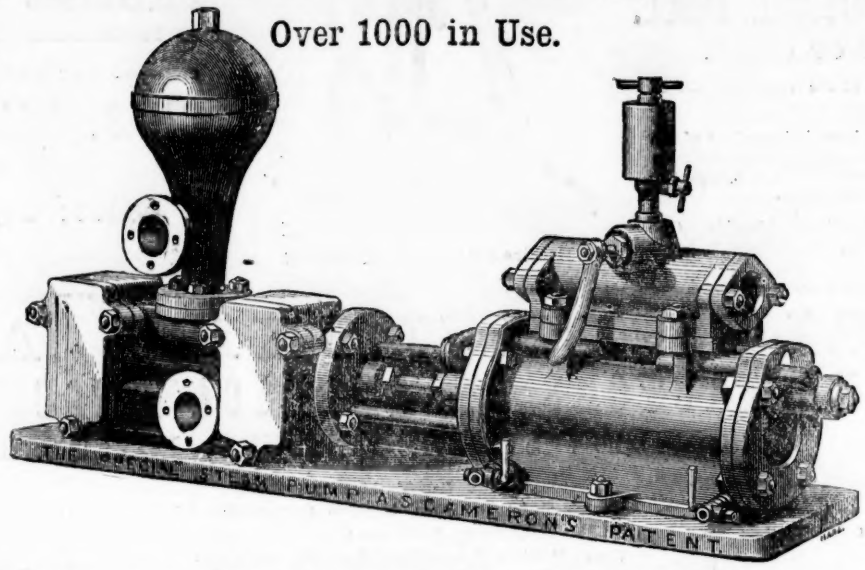
Over 1000 in Use.

IN USE AT THE FOLLOWING QUARRIES:—

Carnarvon and Bangor Slate Co. ...	5	Pumps.
Kellow, J. E., North Wales Slate Co...	1	„
New Zealand Quartz Crushing and Gold Mining Company...	1	„
Scott, R W., Dungannon, Ireland ...	1	„
Foster, J. S., Hebburn Quarries ...	1	„

IN USE AT THE FOLLOWING CHEMICAL WORKS:—

Alum and Ammonia Co., Bow Common	2	Pumps.
Barnes, W. C., Hackney Wick... ...	2	„
Burt, Boulton, and Hayward, Tar Works, Millwall	1	„
Cory and Co., Manor-street, Old Kent-road	2	„
Whiffen, Thomas, Battersea	1	„
Jones, W., and Co., Middlesborough...	4	„
Jarrow Chemical Co., South Shields..	1	„
Richardson, J. G. and N. H., Jarrow-on-Tyne	1	„
Read, Holliday, & Sons, Huddersfield	1	„
Sheldon, Nixon, and Co., West Jarrow	2	„
Tennant, C., and Co., near Newcastle.	7	„
Webb, H., & Co. (Manure), Worcester	1	„
Union Chemical Company, Stratford..	1	„



NOTE.

Requires NO Shafting, Gearing, Riggers, or Belts.

All Double-Acting:

Works at any Speed, and any Pressure of Steam.

Will Force to any Height.

Delivers a constant stream.

Can be placed any distance away from a Boiler.

Occupies little space.

Simple, Durable, Economical.

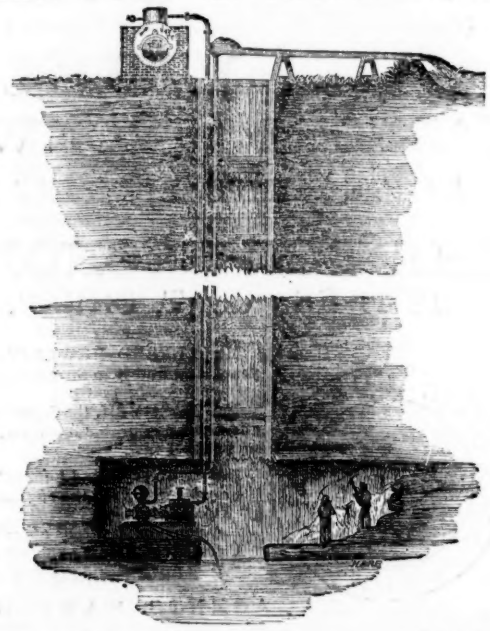
IN USE AT THE FOLLOWING COLLIERIES:—

Adelaide Colliery, Bishop Auckland	3	Pumps.	North Bitchburn Colliery, Darlington	2	Pumps.	Stott, James, and Co., Burslem	1	Pumps
Acomb Colliery, Hexham	1	„	Newton Cap Colliery, Darlington... ...	1	„	Seaton Delaval Coal Company, near Newcastle	1	„
Blackfell Colliery, Gateshead	1	„	Normanby Mines	1	„	Thornley Colliery, Ferryhill	1	„
Black Boy Colliery, Gateshead	1	„	Oakenshaw Colliery	1	„	Thompson, John, Gateshead	2	„
Castle Eden Colliery	2	„	Pease's West Colliery	2	„	Trimdon Grange Colliery	1	„
Crofton, J. Ct., near Ferryhill	1	„	Pease, J. and J. W., near Crook	5	„	Tudhoe Colliery	4	„
Carr, W. C., Newcastle	4	„	Pease, J. and J., Brandon Colliery ...	1	„	Vobster and Mells Colliery	2	„
Etherley Colliery	1	„	Pegswood Colliery, near Morpeth ...	2	„	Widdrington Colliery, Morpeth	2	„
Gidlow, T., Wigan	3	„	Pelton Fell Colliery	1	„	Whitworth and Spennymoor Colliery ...	3	„
Haswell, Shotton, and Easington Coal Co.	2	„	Railey Fell Colliery, Darlington	1	„	Westerton Colliery, Bishop Auckland ...	1	„
Lochgelly Iron and Coal Company ...	1	„	Right Hon. Earl Durham, Fence Houses	1	„	Wardley Colliery, Gateshead	1	„
Leather, J. T., near Leeds	2	„	Skelton Mines	1	„	Westminster Brymbo Coal Company ...	2	„
Lumley Colliery, Fence Houses	1	„	South Benwell Colliery	4	„	Weardale Coal and Iron Company ...	5	„
Monkwearmouth Colliery, Sunderland...	1	„	St. Helens (Tindale) Colliery	1	„			

IRONWORKS AND ROLLING MILLS:—

Bede Metal Company, Jarrow	11	Pumps.	Gilkes, Wilson, Pease, and Co, Middlesboro'..	2	Pumps.	Whitwell and Co., Stockton	3	Pumps
Bagnall, C. and T., Grosmont Ironworks	2	„	Lloyd and Co., Middlesborough	1	„	Whessoe Ironworks, Darlington	1	„
Consett Ironworks	2	„	Solway Hematite Iron Company, Maryport	1	„	West Cumberland Hematite Iron Company	1	„
Castleford Foundry Company, Normanton	1	„	Vaughan, Thomas, Middlesborough ...	2	„	Westbury Iron Company	1	„
Ellen Rolling Mills, Maryport	1	„	The Shotts Iron Company, Edinburgh ...	1	„			

THE "SPECIAL" STEAM PUMP AS APPLIED FOR DRAINING MINES.



The arrangement in the accompanying illustration shows an economical method of draining mines without the expense of erecting surface-engines, fixing pump-rods, or other gearing. A boiler adjacent to the pit's mouth is all that is necessary on the surface; from thence steam may readily be taken down, by means of a felted steam-pipe, to connect the pump with the boiler. The pump may be placed in any situation that may be convenient for working it, and connecting the steam, suction, and delivery pipes.

These engines can be fixed and set to work in a comparatively short time, and also at a very small outlay. They are used in large mines as auxiliary engines, and will be found invaluable adjuncts in all mining operations.

To estimate the quantity of water to be raised by any given size of pump refer to the tabulated list below. It is recommended to use long-stroke pumps where the height exceeds 100 ft., so that the largest result may be obtained with a minimum wear and tear of the pump pistons and valves. The pumps are provided with doors for ready access to all working parts.

PRICES OF THE "SPECIAL" STEAM PUMPS.

Diameter of Steam Cylinder .....inches	2½	3	4	4	6	6	6	7	7	7	8	8	8	8	10	10	12	12	14	16	26
Diameter of Water Cylinder .....inches	1¼	1½	2	4	3	4	6	5	6	7	4	6	7	8	6	7	8	10	8	7	6½
Length of Stroke.....inches	6	9	9	12	12	12	12	12	12	12	12	12	12	18	12	12	18	24	48	24	72
Strokes per minute	100	100	70	50	50	50	50	50	50	50	50	50	50	35	50	50	35	—	—	—	—
Gallons per hour	310	680	815	3250	1830	3250	7330	5070	7330	9750	3250	7330	9750	13,000	7330	9750	13,000	—	—	—	—
PRICE.....	£10	£15	£20	£35	£30	£40	£47 10	£50	£52 10	£57 10	£50	£55	£65	£85	£70	£80	£100	—	—	—	—

IF BRASS LINED, OR SOLID BRASS OR GUN-METAL WATER CYLINDERS, WITH COPPER AIR VESSELS, EXTRA, ACCORDING TO SIZE.

Any Combination can be made between the Steam and Water Cylinders, provided the Lengths of Stroke are the same, thus—8 in. Steam and 3 in. Water, or 10 in. Steam and 3 in. Water, adapted to height of lift and pressure of steam, and so on.

TANGYE BROTHERS & HOLMAN, 10, Laurence Pountney-lane, London, E.C.

Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors), at their office, 26, FLEET STREET, E.C., where all communications are requested to be addressed.—Nov. 30, 1872.